SLV-M10HF

RMT-V249

SERVICE MANUAL

US Model
Canadian Model

Hi-Fi

VHS

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT Ⅵ for MECHANICAL ADJUSTMENTS. (9-921-647-11)**

S MECHANISM

SPECIFICATIONS

System

Format
VHS NTSC standard
Video recording system
Rotary head helical scanning FM system
Video heads
Double azimuth four heads
Video signal
NTSC color, EIA standards
Tape speed
SP: 33.35 mm/s (1 3/8 inches/s)
EP: 11.11 mm/s (7/16 inches/s)
LP: 16.67 mm/s (11/16 inches/s), playback only
Maximum recording/playback time
8 hrs. in EP mode (with T-160 tape)
Fast-forward and rewind time
Approx. 3 min. (with T-120 tape)

Tuner section

Channel coverage
VHF 2 to 13
UHF 14 to 69
CATV A-8 to A-1, A to W, W+1 to W+84
Antenna
75-ohm antenna terminal for VHF/UHF

Inputs and outputs

LINE-1 IN and -2 IN
VIDEO IN, phono jack (1 each)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, phono jack (2 each)
Input level: 327 mVrms
Input impedance: more than 47 kilohms
LINE OUT
VIDEO OUT, phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, phono jack (2)
Standard output: 327 mVrms
Load impedance: 47 kilohms
Output impedance: less than 10 kilohms
S-LINK (CONTROL S IN)
Mini jack (1)
CABLE BOX CONTROL (CONTROL S OUT)
Stereo mini jack (plug in power) (1)
CPD IN
Mini jack (1)

Timer section

Clock
Quartz locked
Timer indication
12-hours cycle
Timer setting
8 programs per month (max.)
Power back-up
Built-in self-charging capacitor
Back-up duration: up to 1 hour at a time

General

Power requirements
120 V AC, 60 Hz
Power consumption
24 W
Operating temperature
5 °C to 40 °C (41 °F to 104 °F)
Storage temperature
– 20 °C to 60 °C (– 4 °F to 140 °F)
Dimensions
Approx. 430 × 107 × 287 mm (w/h/d)
Approx. (17 × 4 1/4 × 11 3/8 inches) including projecting parts and controls
Mass
Approx. 4.5 kg (9 lb 15 oz)

Supplied accessories

Remote commander (1)
Size AA (R6) batteries (2)
75-ohm coaxial cable with F-type connectors (1)
Audio/video cable (3 phono, 1 mini to 3 phono, 1 mini) (1)
Monaural cable (1-mini to 1-mini) (1)
Cable Mouse (cable box controller) (1)
Jack cover (1)
SmartFile labels (5)

Design and specifications are subject to change without notice.

VIDEO CASSETTE RECORDER

SONY®

MICROFILM

[NOTE ON REPAIRING HARNESSES BETWEEN AN-16/17 BOARDS AND NL-2 BOARD]

AN-16 board		NL-2 board
CN201	←——→	CN002
AN-17 board		NL-2 board
CN101	←——→	CN001

Be sure to use the original one or equivalent (AWG, length).
If not so, the resonance frequency will be changed.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
6. Check the B+ voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

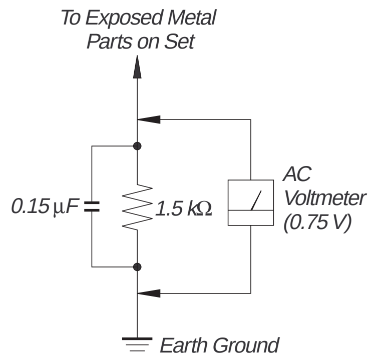

Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA TW-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

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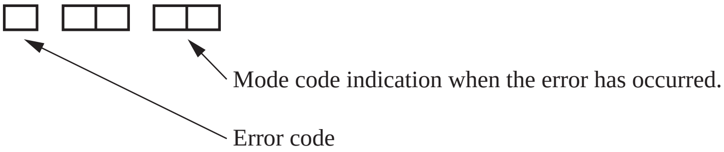
SERVICE NOTE

1. ERROR CODE INDICATION

- Error codes are indicated using the lower 5 digits in the fluorescent display tube.
  "At this time, Colon ":" between character is not indicated."



ERROR CODE

0	No error
1	Cam encoder error Loading direction
2	Cam encoder error Unloading direction
3	T reel error
4	S reel error
5	Capstan error
6	Drum error
7	Error on initializing
8	Cassette loading error
9	Reserve

MODE CODE

0	Power-on eject	10	FWD x1	20	REW play
1	Power-on initial	11	FWD x2	21	Cas. loading
2	Power-off eject	12	CUE	22	Tape loading
3	Power-off stop	13	PB-pause	23	Power-off loading
4	FF	14	RVS-pause	24	Mecha. error (Power on)
5	REW	15	RVS x1	25	Power-on eject initial
6	REC	16	RVS x2	26	Power-off eject initial
7	REC- pause	17	REV	27	APC REC
8	Power-on stop	18	Power-off initial	28	Cas. loading (No auto PB check)
9	PB	19	Mecha. error (Power off)		

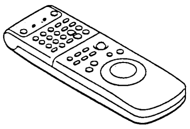
SECTION 1
GENERAL

This section is extracted from instruction manual.

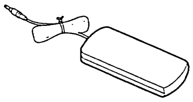
Step 1
Unpacking

Check that you have received the following items with the VCR:

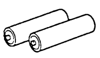
- Remote commander



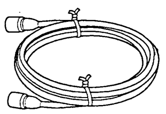
- Cable Mouse (cable box controller)



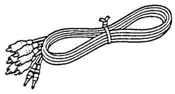
- Size AA (R6) batteries



- 75-ohm coaxial cable with F-type connectors

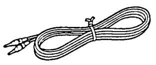


- Audio/video cable (3-phono, 1-mini to 3-phono, 1-mini)

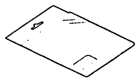


- Jack cover

- Monaural cable (1-mini to 1-mini)



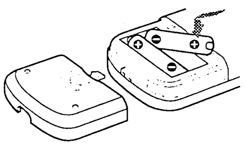
- SmartFile labels



Step 2
Setting up the remote commander

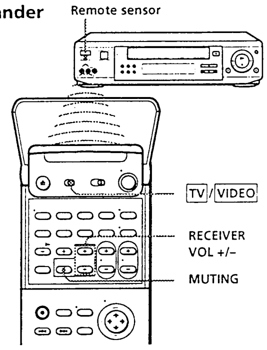
Inserting the batteries

Insert two size AA (R6) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.
Insert the negative (–) end first, then push in and down until the positive (+) end clicks into position.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV or AV receiver. Buttons on the remote commander marked with a dot (•) can be used to operate your Sony TV.
The RECEIVER VOL +/– and MUTING buttons can be used to operate your Sony AV receiver.



To operate	Set TV / VIDEO to
the VCR	VIDEO and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

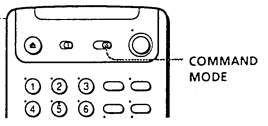
Notes
- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.
- Some Sony AV receivers may not be operated with the remote commander.

continued

Step 2: Setting up the remote commander (continued)

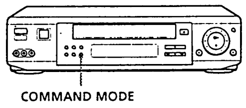
Setting the COMMAND MODE switch

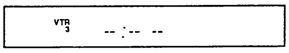
To remotely control the VCR with the remote commander, set COMMAND MODE on the remote commander to the same position as that on the VCR. Usually set to VTR 3. Change the position as shown below to control other Sony VCRs:



VTR 1: For Sony Betamax format VCRs
VTR 2: For Sony 8mm format VCRs
VTR 3: For Sony VHS format VCRs

To change the command mode position of the VCR, press and hold COMMAND MODE on the VCR for two seconds and repeat until the desired position appears in the display window.





Controlling other TVs with the remote commander

The remote commander is preprogrammed to control non-Sony TVs. If your TV is listed in the table below, set the appropriate manufacturer's code number.

1 Set TV / VIDEO at the top of the remote commander to TV.

2 Hold POWER down, and enter your TV's code number(s) using the number buttons. Then release POWER.

Now you can use the POWER, VOL +/–, CH +/–, and TV/VIDEO buttons to control your TV. You can also use the buttons marked with a dot (•) to control a Sony TV. To control the VCR, reset TV / VIDEO to VIDEO.

Tip
- If you set your TV's code number correctly while the TV is turned on, the TV turns off automatically.

Code numbers of controllable TVs

If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

Manufacturer	Code number	Manufacturer	Code number	Manufacturer	Code number
Sony	01	JVC	09	RCA	04, 10
Akai	04	KMC	03	Sampo	12
AOC	04	Magnavox	03, 08, 12	Sanyo	11
Centurion	12	Marantz	04, 13	Scott	12
Coronado	03	MGA/Mitsubishi	04,12,13,17	Sears	07, 10, 11
Curis-Mathes	12	NEC	04, 12	Sharp	03, 05, 18
Daytron	12	Panasonic	06, 19	Sylvania	08, 12
Emerson	03, 04, 14	Philco	03, 04	Teknika	03, 08, 14
Fisher	11	Philips	08	Toshiba	07
General Electric	06, 10	Pioneer	16	Wards	03, 04, 12
Gold Star	03, 04, 17	Portland	03	Yorx	12
Hitachi	02, 03	Quasar	06, 18	Zenith	15
J.C.Penny	04, 12	Radio Shack	05, 14		

Notes
- If the TV uses a different remote control system from the one programmed to work with the VCR, you cannot control your TV with the remote commander.
- If you enter a new code number, the code number previously entered will be erased.
- When you replace the batteries of the remote commander, the code number may automatically reset to 01 (Sony). If your TV is not a Sony, it is recommended to manually set the appropriate code number every time you replace the batteries.

Step 3

Hookups

Selecting the best hookup option

There are many ways in which your VCR can be hooked up. To hook up your VCR so that it works best for you, first scan through the table below. Then use the accompanying diagrams and procedures on the following pages to set up your VCR.

If you have	Use	Refer to
TV that has audio/video inputs	Audio/video (A/V) hookup, then follow one of the hookups below.	Pages 9 and 10
Cable box that is compatible with the VCR's cable box control feature	Hookup 1	Pages 11 to 13
No cable box or incompatible cable box with only a few scrambled channels	Hookup 2	Pages 14 to 16
Antenna only, no cable TV	Hookup 3	Pages 17 to 19
Incompatible cable box with many scrambled channels	Hookup 4	Pages 20 to 23
DSS®* receiver	Hookup 5	Pages 24 to 26
Incompatible cable box with only a few scrambled channels, using an A/B switch	Hookup 6	Pages 27 to 31

After you've completed the connections, follow the instructions for setup. During setup, if you need more details on the procedure described, page numbers are provided where you can find complete, step-by-step instructions.

After you've completed the setup, you're ready to use your VCR. Procedures differ depending on the hookup you used. For an overview, refer to "Quick reference to using the VCR" on the back cover.

Before you get started

- Turn off the power to all equipment.
- Do not connect the AC power cords until all of the connections are completed.
- Be sure you make connections firmly. Loose connections may cause picture distortion.
- If your TV doesn't match any of the examples provided, see your nearest Sony dealer or qualified technician.

* DSS® is a registered trademark of DIRECTV, Inc., a unit of Hughes Electronics Corporation.

Audio/video (A/V) hookup — Pages 9 and 10

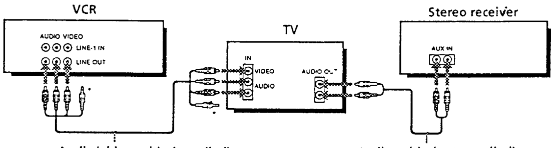
If your TV has audio/video (A/V) input jacks, you will get a better picture and sound if you hook up your VCR using these connections. In addition, for a true "home theater" experience, you should connect the audio outputs of your VCR or TV to your stereo system. If your TV doesn't have A/V inputs, see the following pages for antenna or cable hookups.

If your TV has the S-Link™* (A/V bus control) function, hook up your VCR using the connection shown on page 10. Your TV will automatically switch to the A/V inputs for your VCR when you play back or operate menu on the VCR.

If you're not planning to use your VCR to record programs, you're finished setting up the VCR after you've made the connections shown on pages 9 and 10. If you want to record off-air or off your cable TV system, complete these connections first, and then go to the following pages for antenna or cable hookups.

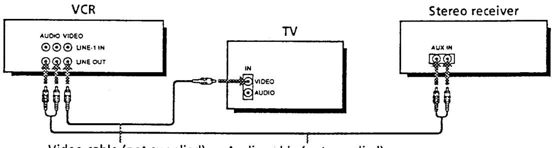
* S-Link™ is a trademark of Sony Corporation.

A Use this hookup if your TV has stereo jacks



* Do not connect the miniplugs for this hookup.

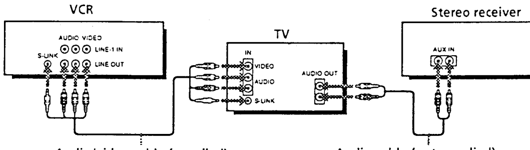
B Use this hookup if your TV doesn't have stereo jacks



continued

Step 3: Hookups (continued)

C Use this hookup if your TV has the S-Link™ function



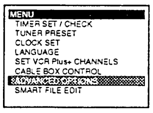
Note

- To play a tape in stereo, you must use the A/V connection.

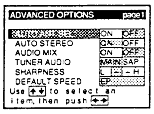
A/V hookup: VCR setup

After you've connected your TV and completed antenna or cable hookup, use the following procedure to set up the VCR.

Press MENU and select ADVANCED OPTIONS.



Set AUTO ANT SEL to OFF and press the cursor stick (OK).



For details, see page 82.

Caution

Connections between the VCR's VHF/UHF connector and the antenna terminals of the TV receiver should be made only as shown in the following instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of RF devices. Never connect the output of the VCR to an antenna or make simultaneous (parallel) antenna and VCR connections at the antenna terminals of your receiver.

Note to CATV system installer (in USA)

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Hookup 1 — Pages 11 to 13

Using cable box control

Recommended use

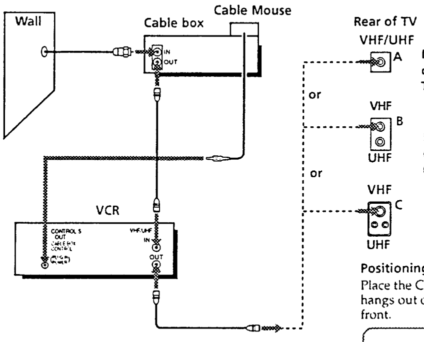
You should use this hookup if you have a cable box, especially if your cable system scrambles all or most channels. This hookup allows the VCR's cable box control feature to control the channel on the cable box, simplifying the recording process. A list of compatible cable boxes is on pages 40 and 41.

What you can do with this hookup

- Record any channel using the VCR's cable box control feature to select channels on the cable box

What you can't do

- Record with the cable box turned off
- Record one channel while watching another channel

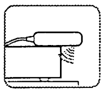


Match the type of connector on your TV: A, B, or C.

For connector types B and C, no UHF connection is required.

Positioning the Cable Mouse

Place the Cable Mouse so that it hangs out over the cable box front.

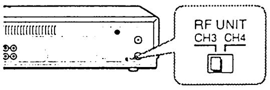


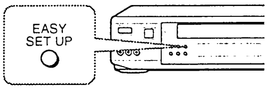
Side view

continued

Hookup 1: VCR setup

1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105.
If you made A/V connections (from page 9), you can skip this step.

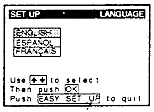




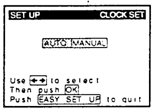
2 Turn on your cable box.

3 Press EASY SET UP on the VCR.

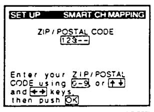
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



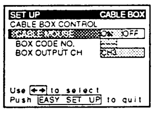
❷ The CLOCK SET menu appears. Select AUTO and press the cursor stick (OK). For details, see page 33.



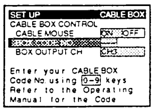
❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)



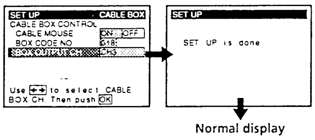
❹ The CABLE BOX menu appears. Select ON. For details, see page 39.



❺ Enter your cable box code number and push the cursor stick to ↓. For details, see page 39.

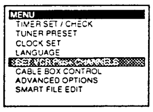


❻ Select your cable box output channel and press the cursor stick (OK).



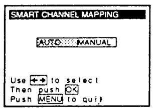
Hookup 1: VCR Plus+ channel setup

1 Press MENU and select SET VCR Plus+ CHANNELS.



2 Push the cursor stick to ←/→ to select AUTO and press the cursor stick (OK).

3 Press POWER to turn off the VCR.



The VCR receives the program information signal from 0:00 am to 5:00 am while the VCR is turned off, and set up the channel for VCR Plus+ recording. After channel setup is finished, you can record TV programs using VCR Plus+. For details, see page 49.

Notes

- To use auto VCR Plus+ channel setup feature, leave the cable box on.
- It takes about 1 hour to complete channel setup.
- The VCR can receive the program information signal only while the VCR is turned off and no timer recordings are set.
- If the channels in your area don't carry the program information signals, set the program guide channels manually. For details, see page 51.
- If the Choose your Cable CH MAP menu appears the first time you turn on the VCR after finishing channel setup, select the MAP number. For details, see page 50.

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

Note

- To use the Auto Clock Set feature, leave the cable box on.

continued

Hookup 2 — Pages 14 to 16

No cable box, or incompatible cable box with only a few scrambled channels

Recommended use

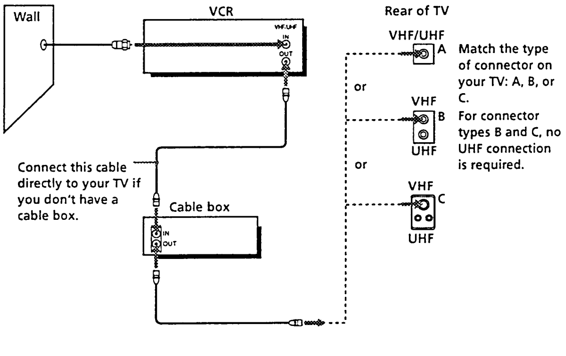
Use this hookup if you do not have a cable box. Also use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles only a few channels.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel on the VCR

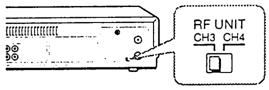
What you can't do

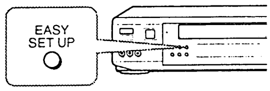
- Record scrambled channels that require a cable box



Hookup 2: VCR setup

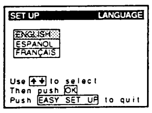
1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105.
If you made A/V connections (from page 9), you can skip this step.



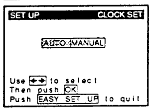


2 Press EASY SET UP on the VCR.

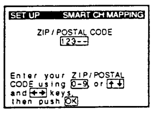
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



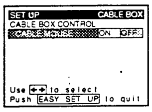
❷ The CLOCK SET menu appears. Select AUTO and press the cursor stick (OK). For details, see page 33.



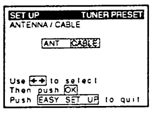
❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)



❹ The CABLE BOX menu appears. Select OFF and press the cursor stick (OK).

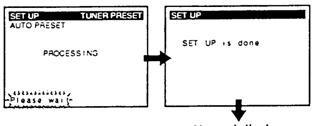


❺ The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press the cursor stick (OK). For details, see page 44.



continued

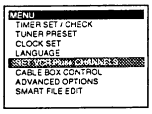
❻ The AUTO PRESET starts.



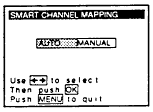
Normal display

Hookup 2: VCR Plus+ channel setup

1 Press MENU and select SET VCR Plus+ CHANNELS.



2 Push the cursor stick to ←/→ to select AUTO and press the cursor stick (OK).



3 Press POWER to turn off the VCR.

The VCR receives the program information signal from 0:00 am to 5:00 am while the VCR is turned off, and set up the channel for VCR Plus+ recording. After channel setup is finished, you can record TV programs using VCR Plus+. For details, see page 49.

Notes
- It takes about 1 hour to complete channel setup.
- The VCR can receive the program information signal only while the VCR is turned off and no timer recordings are set.
- If the channels in your area don't carry the program information signals, set the program guide channels manually. For details, see page 51.
- If the Choose your Cable CH MAP menu appears the first time you turn on the VCR after finishing channel setup, select the MAP number. For details, see page 50.

Automatic clock setting

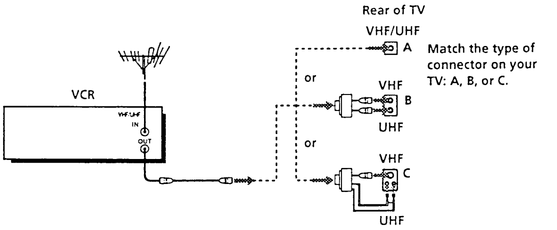
Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

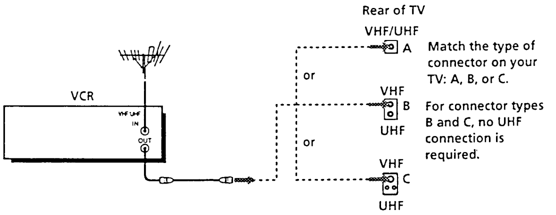
Antenna hookup

Make the following connections if you re using an antenna (if you don't have cable TV).

A Use this hookup if you're using:
- VHF/UHF antenna (you get channels 2–13 and channels 14 and higher)
- UHF-only antenna (you get channels 14 and higher)
- Separate VHF and UHF antennas



B Use this hookup if you're using a VHF-only antenna (you get channels 2–13 only)

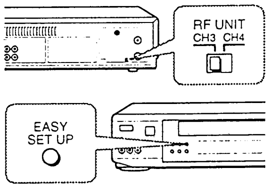


If you cannot connect your antenna cable to the VCR directly
If your antenna cable is a flat cable (300-ohm twin lead cable), attach an external antenna connector (not supplied) so you can connect the cable to the VHF/UHF IN connector. If you have separate cables for VHF and UHF antennas, you should use a U/V band mixer (not supplied). For details, see page 106.

continued

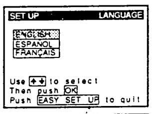
Hookup 3: VCR setup

1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105. If you made A/V connections (from page 9), you can skip this step.

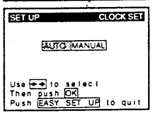


2 Press EASY SET UP on the VCR.

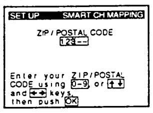
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPANOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



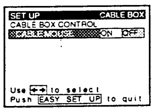
❷ The CLOCK SET menu appears. Select AUTO and press the cursor stick (OK). For details, see page 33.



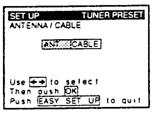
❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)



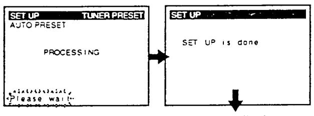
❹ The CABLE BOX menu appears. Select OFF and press the cursor stick (OK).



❺ The TUNER PRESET menu appears. Set ANTENNA/CABLE to ANT and press the cursor stick (OK). For details, see page 44.



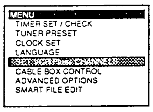
❻ The AUTO PRESET starts.



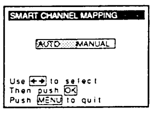
Normal display

Hookup 3: VCR Plus+ channel setup

1 Press MENU and select SET VCR Plus+ CHANNELS.



2 Push the cursor stick to ←/→ to select AUTO and press the cursor stick (OK).



3 Press POWER to turn off the VCR.

The VCR receives the program information signal from 0:00 am to 5:00 am while the VCR is turned off, and set up the channel for VCR Plus+ recording. After channel setup is finished, you can record TV programs using VCR Plus+. For details, see page 49.

Notes
- It takes about 1 hour to complete channel setup.
- The VCR can receive the program information signal only while the VCR is turned off and no timer recordings are set.
- If the channels in your area don't carry the program information signals, set the program guide channels manually. For details, see page 51.
- If the Choose your Cable CH MAP menu appears the first time you turn on the VCR after finishing channel setup, select the MAP number. For details, see page 50.

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

continued

Hookup 4 — Pages 20 to 23

Incompatible cable box with many scrambled channels

Recommended use

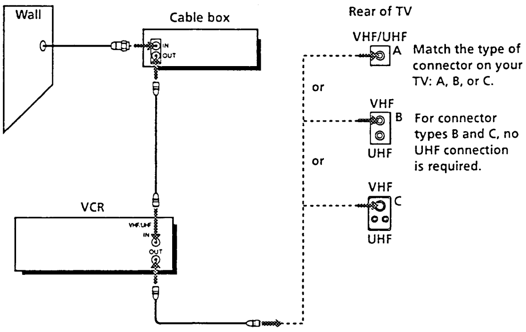
Use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles all or most channels.

What you can do with this hookup

- Record any channel by selecting the channel on the cable box

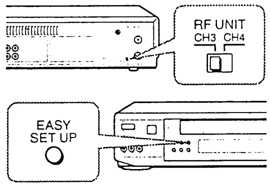
What you can't do

- Record with the cable box turned off
- Record one channel while watching another channel
- Select channels directly on the VCR



Hookup 4: VCR setup

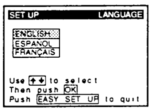
1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105.
If you made A/V connections (from page 9), you can skip this step.



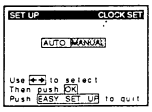
2 Turn on your cable box.

3 Press EASY SET UP on the VCR.

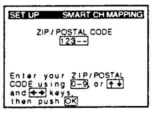
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



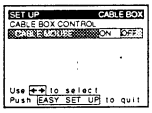
❷ The CLOCK SET menu appears. Select MANUAL, press the cursor stick (OK), and set the clock manually. For details, see page 37.



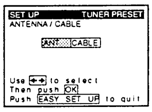
❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)



❹ The CABLE BOX menu appears. Select OFF and press the cursor stick (OK).

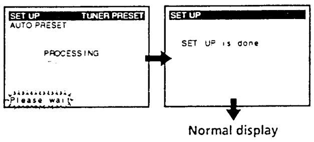


❺ The TUNER PRESET menu appears. Set ANTENNA/CABLE to ANT and press the cursor stick (OK). For details, see page 44.



continued

❻ The AUTO PRESET starts.

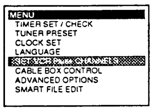


Hookup 4: VCR Plus+ channel setup

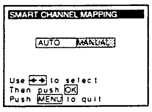
1 Find the VCR Plus+ Channel Line-up Chart in your program guide. For details, see page 48.

2 Enter all the channels you want to record and the cable box output channel (usually 2, 3, or 4). For details, see page 51.

❶ Press MENU and select SET VCR Plus+ CHANNELS.



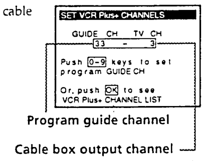
❷ Push the cursor stick to ←/→ to select MANUAL.



❸ Enter the program guide channel, then the cable box output channel.

❹ Press the cursor stick (OK).

❺ Press MENU.



Automatic clock setting

To use the Auto Clock Set feature with this hookup, you need to manually select a channel that carries a time signal:

1 Tune the cable box to a channel that carries a time signal.

2 Select AUTO in the CLOCK SET menu to turn on the Auto Clock Set feature.

3 Turn off the VCR. It automatically sets the clock and adjusts for Daylight Saving Time by picking up the time signal.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

Note

- To use the Auto Clock Set feature, leave the cable box on.

continued

Hookup 5 — Pages 24 to 26

DSS (Digital Satellite System) receiver

Recommended use

Use this hookup if you have a DSS receiver. It allows the VCR's cable box control feature to control the channel on the DSS receiver, simplifying the recording process. A list of compatible DSS receivers is on page 41.

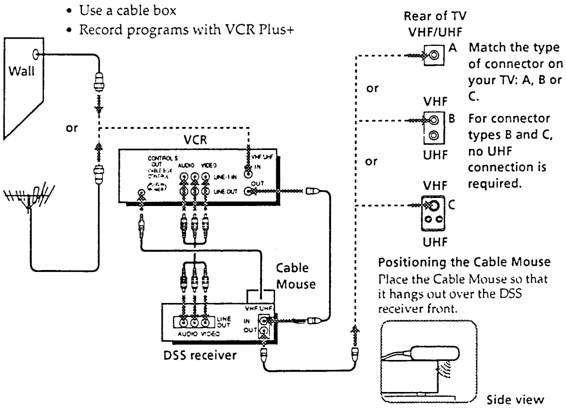
DSS (Digital Satellite System) is a satellite broadcast that provides superior digital-quality video and crisp digital-quality audio. A variety of program packages are available through your program providers. It also has program guides that are sorted by program categories.

What you can do with this hookup

- Record any channels using the VCR's cable box control feature to select channels on the DSS receiver.

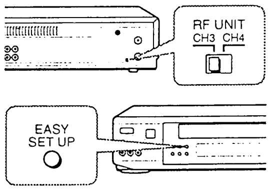
What you can't do

- Record with the DSS receiver turned off
- Record any channels from cable or an antenna
  (To record channels from cable or an antenna, turn off the cable box control feature.)
- Use a cable box
- Record programs with VCR Plus+

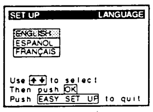


Hookup 5: VCR setup

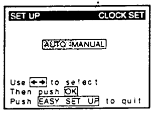
1. Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105.
   If you made A/V connections (from page 9), you can skip this step.
2. Turn on your DSS receiver.
3. Press EASY SET UP on the VCR.



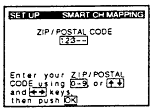
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



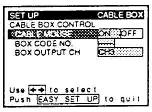
❷ The CLOCK SET menu appears. Select AUTO and press the cursor stick (OK). For details, see page 33.



❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)

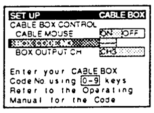


❹ The CABLE BOX menu appears. Select ON. For details, see page 39.

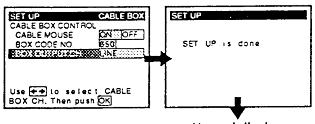


continued

❺ Enter your DSS receiver code number and push the cursor stick to ↓. For details, see page 39.



❻ Set your DSS receiver output channel (BOX OUTPUT CH) to LINE and press the cursor stick (OK).



Normal display

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

Note

- To successfully record a program from the DSS receiver, proceed as follows:
  - Leave the DSS receiver on all the time.
  - Turn off the display (menu screen, channel number, etc.) of the DSS receiver.
  - To record or receive locked channels, unlock the channel before the VCR starts recording.
  - To set pay-per-view programs in the timer setting, order the pay-per-view program before the VCR starts recording.
  - Some programs are copy protected. You cannot record these programs.

Hookup 6 — Pages 27 to 31

Incompatible cable box with only a few scrambled channels, using an A/B switch

Recommended use

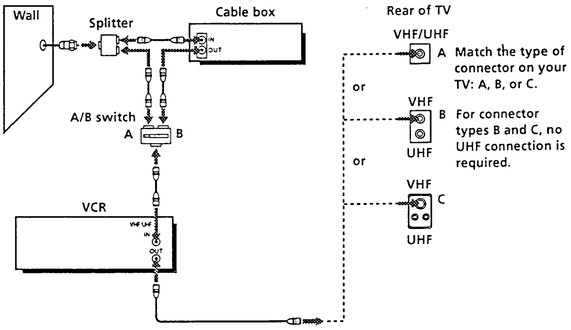
By using an A/B switch (not supplied), this hookup allows you to record both scrambled and unscrambled channels conveniently.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel directly on the VCR (the A/B switch is set to A)
- Record any scrambled channel by selecting the channel on the cable box (the A/B switch is set to B)

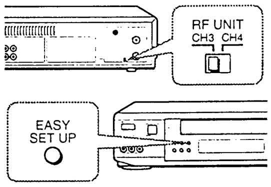
What you can't do

- Record one scrambled channel while watching another channel (the A/B switch is set to B)



continued

Hookup 6: VCR setup

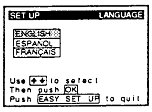


1 Set the RF UNIT switch to CH 3 or CH 4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 105.
If you made A/V connections (from page 9), you can skip this step.

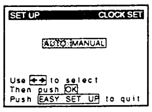
2 Set the A/B switch to "A."

3 Press EASY SET UP on the VCR.

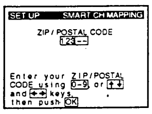
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press the cursor stick (OK). For details, see page 32.



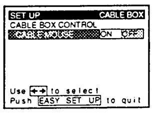
❷ The CLOCK SET menu appears. Select AUTO and press the cursor stick (OK). For details, see page 33.



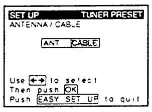
❸ The SMART CH MAPPING menu appears. Push the cursor stick to ↑/↓/←/→ to enter the ZIP/POSTAL CODE in your area and press the cursor stick (OK). (You can also use the number buttons to enter the ZIP/POSTAL CODE.)



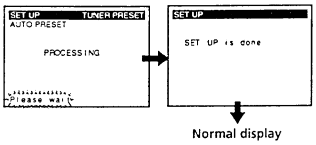
❹ The CABLE BOX menu appears. Select OFF and press the cursor stick (OK).



❺ The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press the cursor stick (OK). For details, see page 44.

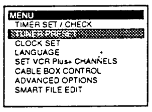


❻ The AUTO PRESET starts.

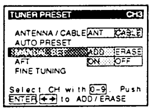


4 Preset the cable box output channel (usually 2, 3, or 4). For details, see page 46.

❶ Press MENU and select TUNER PRESET.



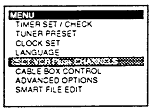
❷ Enter the cable box output channel. Set MANUAL SET to ADD and press the cursor stick (OK).



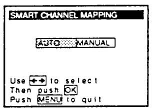
continued

Hookup 6: VCR Plus+ channel setup

1 Press MENU and select SET VCR Plus+ CHANNELS.



2 Push the cursor stick to ←/→ to select AUTO and press the cursor stick (OK).



3 Press POWER to turn off the VCR.

The VCR receives the program information signal from 0:00 am to 5:00 am while the VCR is turned off, and set up the channel for VCR Plus+ recording. After channel setup is finished, you can record TV programs using VCR Plus+. For details, see page 49.

Notes

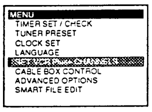
- To use the Smart Channel Mapping feature, set the A/B switch to A.
- It takes about 1 hour to complete channel setup.
- The VCR can receive the program information signal only while the VCR is turned off and no timer recordings are set.
- If the channels in your area don't carry the program information signals, set the program guide channels manually. For details, see page 51.
- If the Choose your Cable CH MAP menu appears the first time you turn on the VCR after finishing channel setup, select the MAP number. For details, see page 50.

VCR Plus+ channel setup for scrambled channels

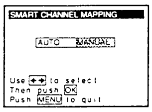
To set the program guide channels for scrambled channels, enter all the scrambled channels you want to record and the cable box output channel (usually 2, 3, or 4) after finishing Smart Channel Mapping. For details, see page 51.

❶ Find the VCR Plus+ Channel Line-up Chart in your program guide. For details, see page 48.

❷ Press MENU and select SET VCR Plus+ CHANNELS, then press the cursor stick (OK).



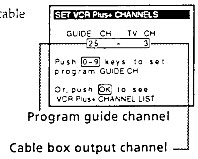
❸ Push the cursor stick to ←/→ to select MANUAL.



❹ Enter the program guide channel, then the cable box output channel.

❺ Press the cursor stick (OK).

❻ Press MENU.



Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

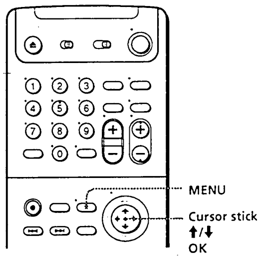
If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 37.

Note

- To use the Auto Clock Set feature, set the A/B switch to A.

Selecting a language

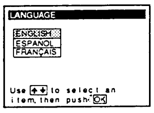
You can change the on-screen display language.



1 • MENU • CURSOR PUSH OK

Press MENU, then push the cursor stick to ↑/↓ to move the cursor to LANGUAGE and press the cursor stick (OK).

When using the EASY SET UP procedure, skip this step.

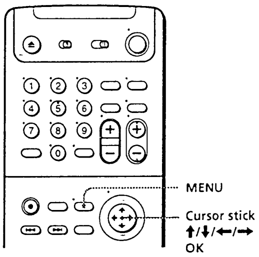


2 • CURSOR PUSH OK

Push the cursor stick to ↑/↓ to select ENGLISH, ESPAÑOL, or FRANCAIS, then press the cursor stick (OK).

Setting the clock

Using the Auto Clock Set feature



Some TV and cable channels transmit time signals with their broadcasts. Your VCR can pick up this time signal to automatically set the clock.

The Auto Clock Set feature works only if a channel in your area is broadcasting a time signal. If broadcasters in your area are not yet sending time signals, set the time manually (page 37).

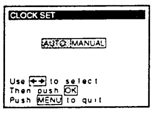
Before you start...

- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the display window.
- Press INPUT SELECT so that a channel number appears in the display window.

1 • MENU • CURSOR PUSH OK

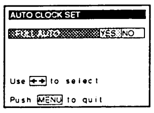
Press MENU, then push the cursor stick to ↑/↓ to move the cursor to CLOCK SET and press the cursor stick (OK).

When using the EASY SET UP procedure, skip this step.



2 • CURSOR PUSH OK

Push the cursor stick to ←/→ to select AUTO, then press the cursor stick (OK).



continued

Setting the clock (continued)

3 • CURSOR PUSH OK

Push the cursor stick to ←/→ to select YES, then press the cursor stick (OK).

4

To activate the Auto Clock Set function, turn off the VCR.

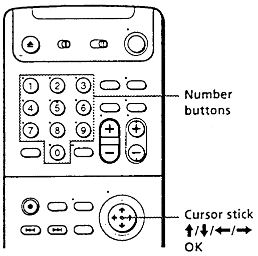
The VCR automatically sets the clock by searching for a channel that carries a time signal and sets your time zone and Daylight Saving Time (if applicable).

If your clock is set to the wrong time zone or Daylight Saving Time, you can adjust these settings without turning off the Auto Clock Set feature (page 35).

Notes

- The clock cannot be set automatically if you don't receive a channel that carries a time signal in your area. If so, set the clock manually.
- If there are only a few channels in your area that carry time signals, setting the clock automatically may take up to about 30 minutes. If nothing happens even after you wait about 30 minutes, set the clock manually.
- If you use Hookup 1, make sure you leave the cable box on.

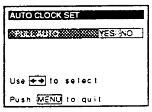
If the clock is not activated



1

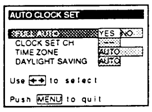
Follow steps 1 and 2 in "Using the Auto Clock Set feature."

The AUTO CLOCK SET menu is displayed.



2 • CURSOR PUSH OK

Push the cursor stick to ←/→ to select NO for FULL AUTO.

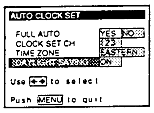


continued

Setting the clock (continued)

3 • CURSOR / PUSH OK

Push the cursor stick to ↑/↓ to highlight the item you want to set, then push the cursor stick to ←/→ to make the setting.



- For CLOCK SET CH
  Leave the setting to "– –" to have the VCR automatically search for a channel that carries a time signal.
  Press the number buttons to select a channel that carries a time signal.
  Use this option if you know of a channel that carries a time signal. Most PBS member stations broadcast a time signal. For the fastest response, select your local PBS station.
- For TIME ZONE
  Select the time zone of your area, or select AUTO to have the VCR automatically set your time zone.
  The options are: AUTO → ATLANTIC → EASTERN → CENTRAL → MOUNTAIN → PACIFIC → ALASKA → HAWAII → AUTO
- For DAYLIGHT SAVING
  Select ON or OFF (standard time), or AUTO to have the VCR automatically set the daylight saving time.

4 • CURSOR / PUSH OK

Press the cursor stick (OK).

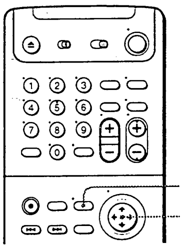
5

To activate the Auto Clock Set function, turn off the VCR.

Notes

- If you use both the cable box control feature and the Auto Clock Set feature, the VCR automatically changes channels on the cable box until a channel that carries a time signal is found, whenever you turn off the VCR.
  If you want to stop the search, change the channel on the cable box with the CHANNEL or CH buttons either on the VCR or on the remote commander.
- If you use Hookup 1 or 4, make sure you leave the cable box on.

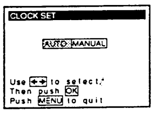
Using Manual Clock Set



1 • MENU / • CURSOR / PUSH OK

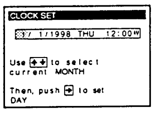
Press MENU, then push the cursor stick to ↑/↓ to move the cursor to CLOCK SET and press the cursor stick (OK).

When using the EASY SET UP procedure, skip this step.



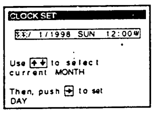
2 • CURSOR / PUSH OK

Push the cursor stick to ←/→ to select MANUAL, then press the cursor stick (OK).



3 • CURSOR / PUSH OK

Push the cursor stick to ↑/↓ to set the month.

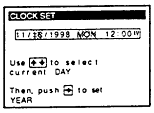


continued

Setting the clock (continued)

4 • CURSOR / PUSH OK

Push the cursor stick to → to highlight the day and push the cursor stick to ↑/↓ to set the day.



5 • CURSOR / PUSH OK

Set the year, hour and minutes in the same way as the day.

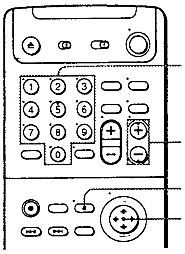
The day of the week is set automatically.

6 • CURSOR / PUSH OK

Press the cursor stick (OK) to start the clock.

Setting up cable box control

(Skip this section if you are using Hookup 2, 3, 4, or 6.)



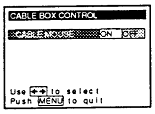
Your VCR includes a cable box control feature that allows the VCR to control most brands of cable boxes/DSS receivers via the Cable Mouse. With cable box control, the VCR controls channels on the cable box/DSS receiver for timer recording. You can also use the VCR's remote commander to change channels on the cable box/DSS receiver whenever the cable box/DSS receiver is turned on even if the VCR is turned off. To use cable box control, you need to connect the Cable Mouse (pages 11 and 24) and set the code number and output channel.

This VCR is programmed with codes necessary to control channel selection on most brands of cable boxes at the time this VCR was manufactured. It is possible that new cable boxes may be introduced that cannot be controlled with this VCR's Cable Mouse. If you have a cable box that is incompatible with this VCR, contact your cable operator — they may be able to provide you with a compatible cable box.

1 • MENU / • CURSOR / PUSH OK

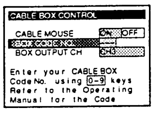
Press MENU, then push the cursor stick to ↑/↓ to move the cursor to CABLE BOX CONTROL and press the cursor stick (OK).

When using the EASY SET UP procedure, skip this step.



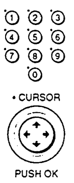
2 • CURSOR / PUSH OK

Push the cursor stick to ←/→ to select ON, then push the cursor stick to ↓.



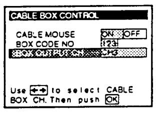
continued

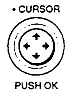
Setting up cable box control (continued)

3 

Press the number buttons to enter the cable box/DSS receiver code number, then push the cursor stick to ↓.

Find your cable box/DSS receiver code number from the chart below.



4 

If you want to control a cable box, push the cursor stick to ←/→ to select the output channel for the cable box, then press the cursor stick (OK).

If you want to control a DSS receiver, select LINE, then press the cursor stick (OK).

Cable box and DSS receiver brand and the corresponding code numbers

If more than one code number is listed, try entering them one by one, until you come to the correct code for your equipment.

Cable box brand	Code numbers
ABC	018, 022, 024, 028, 217
Antronix	218
Archer	033, 050, 164, 218, 808
BBT	278
Cable Star	067
Cabletenna	033
Cable time	172, 388, 459
Century	164
Citizen	164, 326, 327
Clyde Cablevision	097
Colour Voice	036, 042
Comband	243, 244
Comtronics	051, 071
Decsat	434
Diamond	046
Eagle Comtronics	051

Cable box brand	Code numbers
Eastern	013, 285
Electricord	089
Electus	055
Focus	411
Garrard	164
GC Electronics	027, 067, 341
GE	243, 244
GEC	097
Gemini	026, 068, 081
General Instrument	022, 287, 487
Hamlin	020, 031, 045, 270, 284
Hitachi	022
Jasco	164, 326
Jerrold	014, 022, 025, 026, 035, 037, 058, 109, 287, 487
Linsay	451

Cable box brand	Code numbers
Macom	044
Magnavox	038, 043, 080
Memorex	011
Movie Time	089, 167, 214
Northcoast	325
Novaplex	629
NSC	074, 081, 167, 214
Oak	018, 030, 259
Panasonic	032, 118
Paragon	011
Philips	036, 038, 039, 040, 041, 042, 071, 301
Pioneer	034, 155, 271, 544, 695
Popular Mechanics	411
Pulsar	011
Radio shack	808
RCA	032
Realistic	218
Recoton	411
Regal	031, 270, 284, 290
Regency	013
Rembrandt	081
Samsung	051, 155
Scientific Atlanta	017, 019, 028, 288
Seam	521
Sharp	324
Signal	051
Signature	022
SL Marx	051
Spectravision	069
Sprucer	032, 318
Standard Components	107, 166
Starcom	014, 026, 058, 109
Stargate	026, 051

Cable box brand	Code numbers
STS	167
Sylvania	012
T-Cable Teletext	116
Tandy	269
Tatung	108
Teknica	157
TeleCaption	232
Teleservice	292
Texscan	012, 107
TFC	321
Timeless	429
Tocom	023, 024
Toshiba	011
Tudi	297
TV86	074
TV COM	018, 030, 259
Uniden	236
Unika	033, 164, 218
United Artists	018
United Cable	014
Universal	033, 050, 067, 088, 089, 164, 202, 218, 333
Videoway	261
Vidtech	255
Viewstar	038, 071, 074, 122, 222, 269, 300
Zenith	011, 065, 536
Zentek	411
Wave Master	576

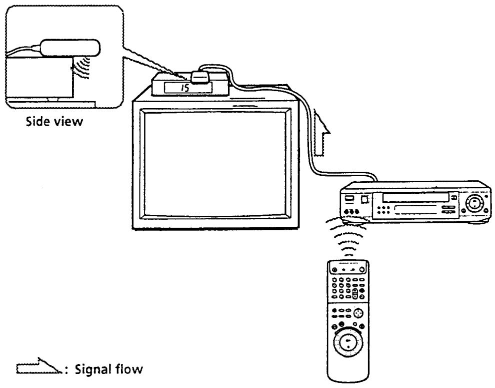
DSS receiver brand	Code numbers
RCA	577
Sony	650

continued

Setting up cable box control (continued)

To ensure correct operation

- Place the Cable Mouse so that it hangs out over the cable box/DSS receiver front.
- Do not place the cable box/DSS receiver on top of the VCR.
- Position the cable box/DSS receiver away from the VCR.
- Point the remote commander at the VCR, not at the cable box/DSS receiver.



To check the cable box control setting

1. Press CH +/– on the remote commander. Does the channel indicator on the cable box/DSS receiver change? (Point the remote commander at the VCR, not at the cable box/DSS receiver.)
2. Press all 10 number buttons (0 to 9) on the remote commander. Does the channel indicator on the cable box/DSS receiver change?

If the answer to both 1 and 2 is "yes," you have made the correct setting.

If you cannot get your VCR to control the cable box/DSS receiver

- Check that the Cable Mouse is connected to the CABLE BOX CONTROL jack on the VCR.
- Check the position of the Cable Mouse.
- Place the cable box/DSS receiver and VCR away from each other. Do not place the cable box/DSS receiver on top of the VCR.
- Try the setup again making sure to use the correct control code. If the cable box still does not respond, try the other codes that are listed.

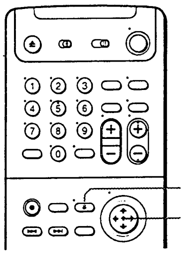
If your cable box still does not operate with the Cable Mouse, contact your cable company to see if they can provide you with a compatible cable box.

Note

- Make sure you turn off the VCR when you plug in or unplug the Cable Mouse. If you unplug the Cable Mouse and plug it in again, turn on the VCR before you use the cable box/DSS receiver control feature.

Presetting channels

(Skip this section if you are using cable box/DSS receiver control feature.)



This VCR is capable of receiving VHF channels 2 to 13, UHF channels 14 to 69 and unscrambled CATV channels 1 to 125. First, we recommend that you preset the receivable channels in your area using automatic presetting. Then, if there are any unwanted channels, disable them manually. If you have decided which channels you wish to preset, set them directly using manual presetting.

Before you start…

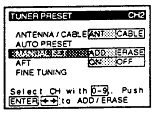
- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the display window.

Presetting all receivable channels automatically

1 • MENU • CURSOR PUSH OK

Press MENU, then push the cursor stick to ↑/↓ to move the cursor to TUNER PRESET and press the cursor stick (OK).

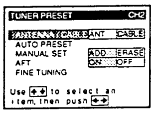
When using the EASY SET UP procedure, skip this step.



2 • CURSOR PUSH OK

- To preset cable TV channels:

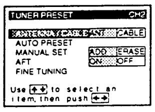
  Push the cursor stick to ←/→ to set ANTENNA/CABLE to CABLE.



• CURSOR PUSH OK

- To preset VHF and UHF channels:

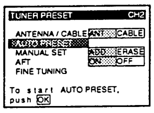
  Push the cursor stick to ←/→ to set ANTENNA/CABLE to ANT.



3 • CURSOR PUSH OK

Push the cursor stick to ↑/↓ to select AUTO PRESET then press the cursor stick (OK).

All receivable channels are preset in numerical sequence. When no more receivable channels can be found, presetting stops and the picture from the lowest numbered channel is displayed on the TV screen.



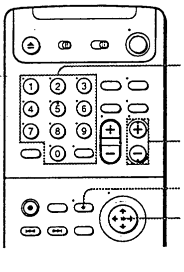
Tip

- When receiving a VHF, UHF, or CATV channel, the display changes as follows each time you press DISPLAY.

Channel number, program name, and station ID (if the broadcaster sends those services)
↓
Remaining tape length, and time counter
↓
The bar indicator and pointer for searching a specific point
↓
No display

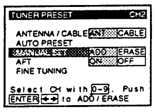
continued

Presetting/disabling channels manually



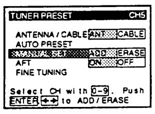
1 • MENU • CURSOR PUSH OK

Press MENU and select TUNER PRESET, then press the cursor stick (OK).



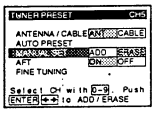
2

- To preset a channel:
  1. Press the number buttons to enter the channel number, then press ENTER.
  2. Push the cursor stick to ←/→ to set MANUAL SET to ADD.



• CH

- To disable a channel:
  1. Press CH +/– to select the channel number.
  2. Push the cursor stick to ←/→ to set MANUAL SET to ERASE.

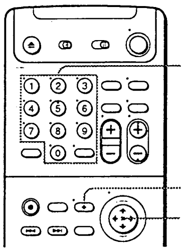


3 • CURSOR PUSH OK

Repeat step 2 to preset or disable channels as required, then press the cursor stick (OK).

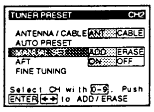
If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture of a channel is not clear, you can also use the manual tuning function.



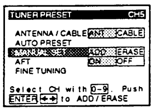
1 • MENU • CURSOR PUSH OK

Press MENU and select TUNER PRESET, then press the cursor stick (OK).



2

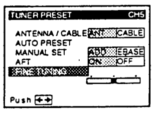
Press the number buttons to select the channel you want to fine-tune, then press ENTER.



3 • CURSOR PUSH OK

Push the cursor stick to ↑/↓ to select FINE TUNING.

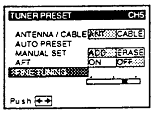
The fine tuning meter appears.



4 • CURSOR PUSH OK

Push the cursor stick to ←/→ to adjust to a clearer picture.

Note that the AFT setting switches to OFF.



Setting up VCR Plus+

How VCR Plus+ works

Whenever you want to record a TV program, all you need to do is look up the program's "PlusCode," a number assigned to each program published in the TV section of most newspapers, cable TV listings, and even *TV GUIDE* magazine. Then, just enter the PlusCode of the program you want and the VCR is automatically programmed to record that show. It's that simple.

How to set up your VCR

Setting up your VCR involves coordinating the TV channel number (the number you turn to on your TV or VCR to watch a program) with the guide channel (the number that's assigned to that channel in your program guide).

The VCR can set the guide channels automatically (see page 49), but you may have to set the guide channels manually depending on your area or the way you hooked up your VCR (see page 51).

To find the guide channel numbers, look at the "Channel Line-up Chart" in the program guide for your area that features VCR PlusCodes. It usually looks like the example to the right.

Example of "PlusCode"

PlusCode

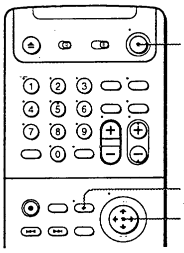
5:30 14 MOVIE — Musical (2hrs.) 33044
2 SPORT — Golf (1hr. 25min.) 42060
CNN — WS 9974
6:30 2 3 4 DRAMA — Comedy (2hrs.) 17390
5 SCIENCE AND TECHNOLOGY (1hr. 15min.) 73457

Example of "Channel Line-up Chart"

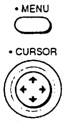
CABLE CH	CABLE TV	VCR Plus+ GUIDE CH
16	AMC American Movie Classics	35
17	BRV Bravo (program grid only)	54
20	CNN Cable News Network	42
21	CSP C-SPAN	28
22	DIS The Disney Channel	53
25	DSC The Discovery Channel	37
34	ESN ESPN	34
35	FAM The Family Channel	47
5	HBO Home Box Office	33
27	LIF Lifetime	46
29	MAX Cinemax	45
30	MTV Music Television	48
31	NIK Nickelodeon	38
38	SC Sports Channel	59
39	SCA Sports Channel America	70
45	SHO Showtime	41
17	TBS TBS SuperStation	43
44	TMC The Movie Channel	58
49	TNN The Nashville Network	49
50	TNT Turner Network Television	52
51	USA USA Network	44

Setting up VCR Plus+ automatically (Smart Channel Mapping)

The VCR can automatically set the guide channels in your area from ZIP/POSTAL CODE you entered in EASY SET UP. The VCR receives the program information signal and renews the data everyday after you complete the following procedure.

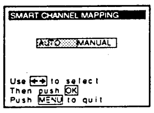


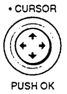
1 Set up the VCR using the EASY SET UP function.

2 

Press MENU, then push the cursor stick to ↑/↓ to move the cursor to SET VCR Plus+ CHANNELS and press the cursor stick (OK).

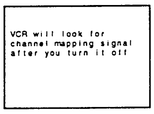
The SMART CHANNEL MAPPING menu appears.



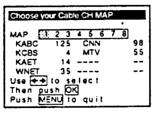
3 

Push the cursor stick to ←/→ to select AUTO and press the cursor stick (OK).

The instruction shown on the right appears on the TV screen for few seconds, then the screen returns to the normal display.

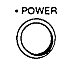


If the program information signal in your area has several channel map patterns, the Choose your Cable CH MAP menu appears, and you must select the channel map. See "To select the channel map" on the next page.



continued

Setting up VCR Plus+ (continued)

4 

Press POWER to turn off the VCR.

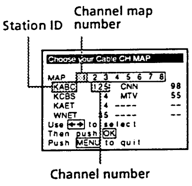
The VCR sets the program guide channels from 0:00 am to 5:00 am while the VCR is turned off. (It takes about 1 hour to complete channel mapping.)

To select the channel map

If the program information signal in your area has several channel map patterns (up to 8), the Choose your Cable CH MAP menu appears:

- the first time you turn on the VCR after completing channel mapping
- after selecting AUTO and pressing the cursor stick (OK) on the SMART CHANNEL MAPPING menu

In this case, you have to select the channel map on the Choose your Cable CH MAP menu.



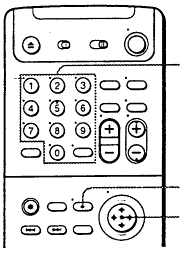
1. Find the VCR Plus+ Channel Line-up Chart in your program guide. For details, see page 48.
2. Push the cursor stick to ←/→ to select the channel map number you want by checking the channel number in the program guide.
3. Press the cursor stick (OK).

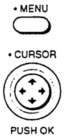
Notes

- It takes about 1 hour to complete channel mapping.
- The VCR can receive the program information signal only while the VCR is turned off and no timer recordings are set.
- The VCR cannot set the guide channels correctly unless you enter the ZIP/POSTAL CODE in your area.
- When you move to a different area, you must set up the VCR again and enter your new ZIP/POSTAL CODE in the EASY SET UP procedure.

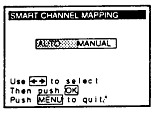
Setting up VCR Plus+ manually

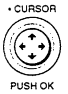
To set the guide channels manually, use the Channel Line-up Chart to check that the guide channel numbers match the TV channel your VCR receives. For example, if HBO is listed in the Channel Line-up Chart on channel 33, and your VCR receives HBO on channel 5, you need to coordinate these numbers using the following procedure. If the guide and TV channel numbers are the same, you can skip this procedure.



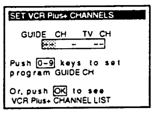
1 

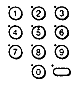
Press MENU, then push the cursor stick to ↑/↓ to move the cursor to SET VCR Plus+ CHANNELS and press the cursor stick (OK).



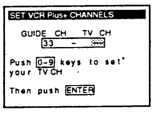
2 

Push the cursor stick to ←/→ to select MANUAL and press the cursor stick (OK).



3 

Enter the guide channel number assigned in the program guide and press ENTER.

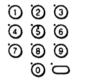


continued

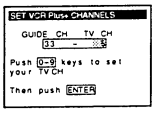
Getting Started

Getting Started

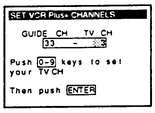
Setting up VCR Plus+ (continued)

4 

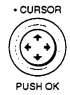
- If you made Hookup 1, 2, or 3: Enter the actual number on your TV (and VCR) and press ENTER.



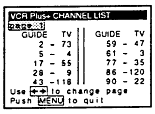
- If you made Hookup 4: Enter the cable output channel (usually 2, 3, or 4) and press ENTER.
- If you made Hookup 6: Enter the actual number on your TV (and VCR) for an unscrambled channel and press ENTER. For a scrambled channel, enter the cable box output channel (usually 2, 3, or 4) and press ENTER.



5 Repeat steps 3 and 4 for each guide channel number that doesn't match.

6 

When you have set all channels, press the cursor stick (OK) to confirm your channel settings.

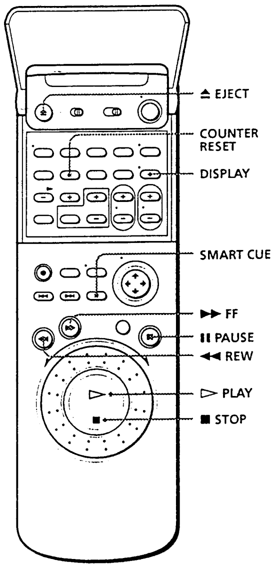


7

After all settings are complete, press MENU to exit.

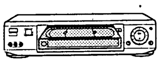
Playing a tape

You can play back both VHS and S-VHS tapes on this VCR. However, you cannot obtain the original resolution quality of S-VHS (simplified playback).



1 Turn on your TV and set it to the video channel.

2 Insert a tape.
The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.



3

Press ▷ PLAY.
When the tape reaches the end, it will rewind automatically.

continued

Playing a tape (continued)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Fast-forward the tape	▶▶ FF during stop
Rewind the tape	◀◀ REW during stop
Eject the tape	≜ EJECT

To skip playback

You can skip a portion of playback you don't want to watch such as a commercial and restart playback by pressing a single button.

1 Press SMART CUE during playback of the scene you want to skip. The VCR starts searching.
2 Press SMART CUE again when you find the scene you want to watch. The VCR stops searching, rewinds a few seconds, then resumes normal playback.

If you press and hold SMART CUE while the VCR is skip searching, the VCR will stop searching, and continue rewinding until you release SMART CUE.

Tip
- You can change the length of rewinding time on the ADVANCED OPTIONS menu. See page 83.

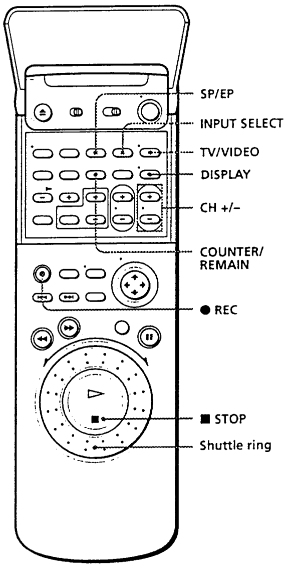
To use the time counter

At the point on the tape that you want to find later, press COUNTER RESET. The counter in the display window resets to "0:00:00." Search for the point afterwards by referring to the counter.

To display the counter on the TV screen, press DISPLAY.

Notes
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The counter resets to "0:00:00" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.

Recording TV programs



1 Turn on your TV and set it to the video channel.
To record from a cable box, turn it on.

2 Insert a tape with its safety tab in place.

continued

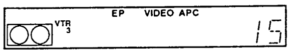
Recording TV programs (continued)

3 INPUT SELECT

Press INPUT SELECT until a channel number appears in the display window.

4 CH

Press CH +/– to select the channel you want to record.



5 SP/EP

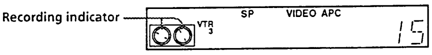
Press SP/EP to select the tape speed, SP or EP.

EP (Extra Play) provides recording time three times as long as SP (Standard Play), however, SP produces better picture quality.

6 REC

Press ● REC to start recording.

The recording indicator lights up red in the display window.

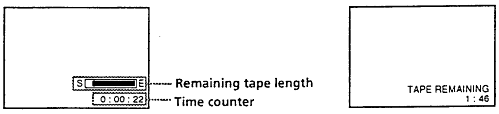


To stop recording

Press ■ STOP.

To check the remaining tape length

Press DISPLAY. The white bar indicates the approximate length of tape remaining. With the display on, press COUNTER/REMAIN to check the remaining time. Each time you press COUNTER/REMAIN, the time counter and the remaining time appear alternately. The remaining time with the ⊘ indicator also appears in the display window.



To check the remaining time of a T-140 or T-180 tape, set TAPE SELECT in the ADVANCED OPTIONS menu to "180." (For details, see page 83.)

To watch another TV program while recording

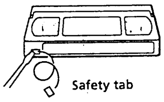
1 Press TV/VIDEO to turn off the VIDEO indicator in the display window.
2 If the TV is connected to the VCR's LINE OUT jacks, set the TV to TV input; if not, skip this step.
3 Select another channel on the TV.

To select the channel using the shuttle ring

To select a channel in step 4 above, you can also use the shuttle ring. During stop, turn the shuttle ring clockwise for higher channels or counterclockwise for lower channels. The VCR switches the channel in the preset order.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.



continued

Recording TV programs (continued)

Tips

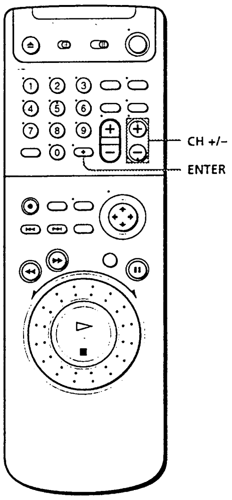
- To select a channel, you can use the number buttons on the remote commander. Enter the channel number, then press ENTER.
- You can select a video source form the LINE-1 IN or LINE-2 IN jacks using INPUT SELECT.
- The display appears on the TV screen indicating information about the tape, but the information won't be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV. When using a cable box, make sure to leave it on.
- You can set the channel with the shuttle ring during stop. However, you cannot set the channel with the shuttle ring on the remote commander when:
  - you set CABLE MOUSE in the CABLE BOX CONTROL menu to ON.
  - you press JOG so that VCR is in jog mode.

Notes

- The remaining time may not be indicated accurately for short tapes such as T-20 or T-30, or tapes recorded in the LP mode.
- The display does not appear during still (pause) mode or slow-motion playback.
- It may take up to one minute for the VCR to calculate and display the remaining time after you press DISPLAY.

Locating a channel by station ID

You can select the TV program from the station ID.



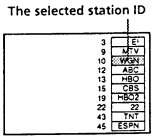
1 Turn on your TV and set it to the video channel.

To record from a cable box, turn it on.

2 • ENTER

Press ENTER.

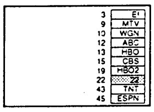
The station ID appears on the TV screen.



continued

Locating a channel by station ID (continued)

3 • CH — Press CH +/– to select the station ID you want.



4 • ENTER — Press ENTER.

Note

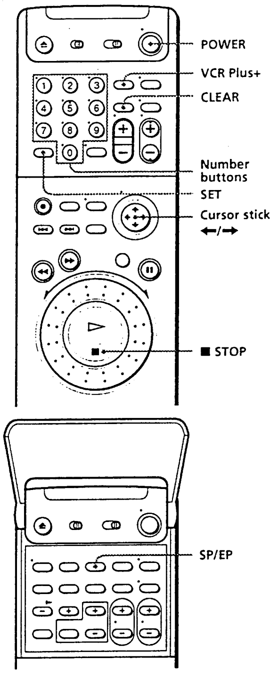
- If the TV channel has no station ID, the channel number appears on the TV screen.

Recording TV programs using VCR Plus+

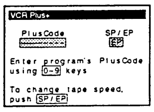
Just enter the program's PlusCode listed in the TV program guide. The date, times and channel number of that program are set automatically. You can preset up to eight programs at a time.

Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- If you insert a tape with the SmartFile function, make sure the total recording time doesn't overlap the protected program. For details about the SmartFile function, see page 100 through 101.



1 VCR Plus+ — Press VCR Plus+.

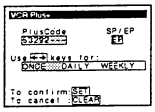


continued

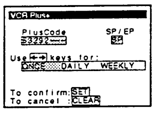
Recording TV programs using VCR Plus+ (continued)

2 — Press the number buttons to enter the program's PlusCode.

If you make a mistake, press CLEAR and re-enter the correct number.

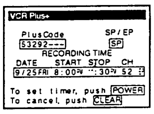


3 SP/EP — Press SP/EP to select the tape speed, SP or EP.



4 • CURSOR, PUSH OK, SET — Push the cursor stick to ←/→ to select ONCE, DAILY, or WEEKLY, then press SET.

To record	Select
Only once	ONCE
Everyday Monday to Friday	DAILY
Once a week	WEEKLY



CLEAR — The date, start and stop times, channel number and tape speed appear on the TV screen. If the information is not correct, press CLEAR to cancel the setting.

5 — To enter another setting, repeat steps 1 to 4.

6 • POWER — Press POWER to turn off the VCR.

The ⊕ indicator appears in the display window and the VCR stands by for recording. When using a cable box, leave it on.

To stop recording

To stop the VCR while recording, press ■ STOP.

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press POWER. The ⊕ indicator turns off and the VCR switches on. Remember to press POWER to reset the VCR in timer recording standby after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV program.

To lock the VCR after setting the timer (Child Lock)

While the VCR turns on, hold POWER down on the VCR until the ⊶ indicator appears in the display window. The VCR turns off and the ⊶ indicator remains lit. The VCR will not work except for timer recording.

To unlock the VCR, hold POWER down on the VCR until the ⊶ indicator disappears from the display window. The VCR is unlocked and turns on.

To stop timer recording while the VCR is locked, press ■ STOP. The recording stops and the VCR is unlocked.

Tips

- To cancel VCR Plus+ recording, press VCR Plus+ before pressing SET in step 4 on page 62.
- When you are recording a program in the SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to the EP mode. Note that some noises will appear on the picture when the tape speed is changed. If you want to keep the tape speed, set AUTO TAPE SPEED to OFF in the ADVANCED OPTIONS menu (page 83).

Notes

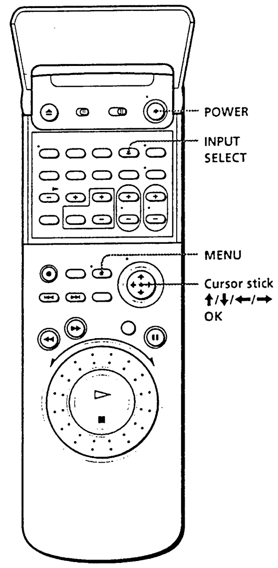
- If the VCR doesn't accept the PlusCode, this means that:
  - the PlusCode is incorrect.
  - ONCE, DAILY, or WEEKLY was selected incorrectly. You cannot select DAILY or WEEKLY for a program that airs more than seven days ahead.
- The VCR will be unlocked when:
  - you stop timer recording by pressing ■ STOP.
  - you insert a tape.
  - the AC power cord is disconnected or power supply stops.

Setting the timer manually

If VCR Plus+ is not available in your area, follow the instructions below to set the timer to record programs.

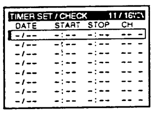
Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- If you insert a tape with the SmartFile function, make sure the total recording time doesn't overlap the protected program. For details about the SmartFile function, see page 100 through 101.



1 • MENU

Press MENU and select TIMER SET/CHECK.

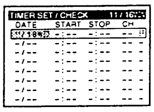


2 • CURSOR / PUSH OK

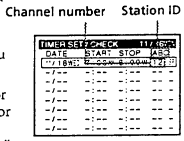
Set the date, start and stop times, channel number and tape speed:

1 Push the cursor stick to → to highlight each item in turn.
2 Push the cursor stick to ↓/↑ to set each item.

To correct a setting, push the cursor stick to ← to return to that setting and reset.



When you set the channel number, the station ID appears on the TV screen. You can set it while checking the station ID.



To record the same program every day or the same day every week, push the cursor stick to ↓ while the date is highlighting. For details, see "Daily/weekly recording" on the next page.

INPUT SELECT

To record from a source connected to the LINE-1 IN or LINE-2 IN jacks, press INPUT SELECT to display "LINE1" or "LINE2" in the "CH" position.

3 • CURSOR / PUSH OK

Push the cursor stick to → to confirm the setting.

The cursor appears at the beginning of the line. To enter another setting, move the cursor to the next line and repeat step 2.

4 • CURSOR / PUSH OK

Press the cursor stick (OK).

5 • POWER

Press POWER to turn off the VCR.

The ⊕ indicator appears in the display window and the VCR stands by for recording.

When using a cable box, leave it on.

continued

Basic Operations

Setting the timer manually (continued)

Daily/weekly recording

In step 2 above, push the cursor stick to ↓ to select the recording pattern. Each time you push the cursor stick to ↓, the indication changes as shown below. Push the cursor stick to ↑ to change the indication in reverse order.

the current date → SUN-SAT → MON-SAT → MON-FRI → EVERY SAT ..... → EVERY MON → EVERY SUN → 1 month later → (date counts down) → the current date

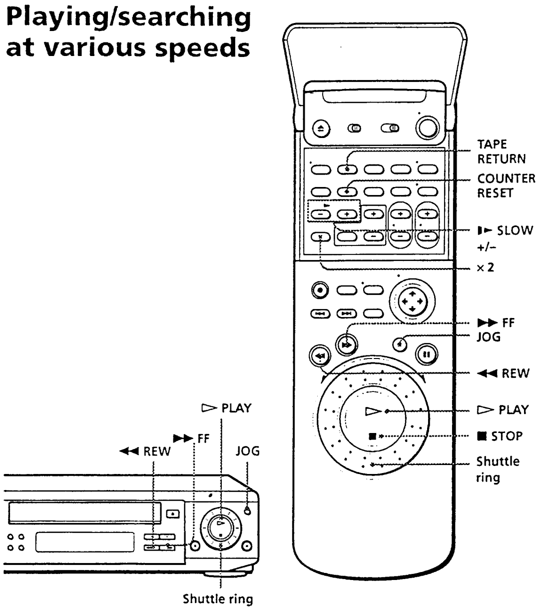
Tips

- To set the channel, you can also use the CH +/– or number buttons.
- You can set the channel with the shuttle ring during stop. However, you cannot set the channel with the shuttle ring on the remote commander when:
  - you set CABLE MOUSE in the CABLE BOX CONTROL menu to ON.
  - you press JOG so that VCR is in jog mode.
- To set the tape speed, you can also use the SP/EP button.
- When you are recording a program in SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to EP mode. Note that some noises will appear on the picture when the tape speed is changed. If you want to keep the tape speed, set AUTO TAPE SPEED to OFF in the ADVANCED OPTIONS menu (page 83).
- To lock the VCR after setting the timer, see page 63.

Notes

- If you are using cable box control, you cannot select "LINE1" or "LINE2."
- The station ID appears on the TV screen only when you complete Smart Channel Mapping and the VCR receives the program information signal (see page 49).

Playing/searching at various speeds



Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, hold ▸▸ FF down. During rewind, hold ◂◂ REW down.
Search forward	Press ▸▸ FF during playback.
Search backward	Press ◂◂ REW during playback.
Play at twice the normal speed	Press × 2 during playback.
Play in slow motion	During playback or pause, press ▸ SLOW +/–. Press the +/– buttons to change the speed.

continued

Playing/searching at various speeds (continued)

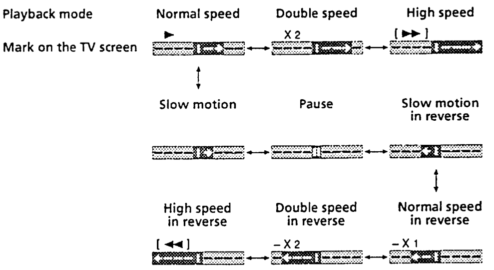
Playback options	Operation
Replay a scene	During playback, first press COUNTER RESET when you come to a scene you want to replay later. When you are ready to replay the scene, press ■ STOP. Then press TAPE RETURN and ▷ PLAY in quick succession.
Rewind and start play	During stop, hold ◄◄ REW on the VCR, and press ▷ PLAY on the VCR.

Using the shuttle ring

With the shuttle ring, you can operate a variety of playback options. There are two ways for using the shuttle ring, normal mode and jog mode.

To use the shuttle ring in normal mode

During playback or pause, turn the shuttle ring clockwise or counterclockwise. Each change in the shuttle ring position changes the playback mode, and the corresponding mark appears on the TV screen for a few seconds in the following way if the on-screen display function is on:



To use the shuttle ring in jog mode

Use this mode for frame-by-frame playback.

Press JOG to enter jog mode. The JOG button lights up. If you change to jog mode during any playback mode, the playback pauses so you can see a still picture. Each change in the shuttle ring position shifts the picture one frame. To shift frames in reverse, turn the shuttle ring counterclockwise.
The frame shift speed depends on the speed you turn the shuttle ring.
To resume normal playback, press JOG again. The JOG indicator goes off.

To resume normal playback

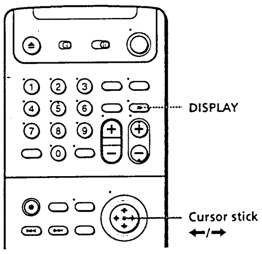
Press ▷ PLAY.

Tip
- Adjust the picture using the TRACKING +/– buttons if:
  - streaks appear while playing in slow motion.
  - bands appear at the top or bottom while pausing.
  - the picture shakes while pausing.

Notes
- The sound is muted during these operations.
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The picture may have snow:
  - when playing at high speed in reverse.
  - when playing in reverse slow motion.
  - when playing in reverse.
- If the playback mode mark doesn't appear on the TV screen, press DISPLAY.
- The picture may flutter a bit when playing in slow motion.

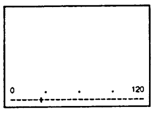
Searching for a selected point on the tape

You can easily find a specific point by moving the pointer on the TV screen. The VCR fast-forwards or rewinds to the point you indicate and starts playback automatically.



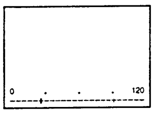
1 Press DISPLAY repeatedly until the bar indication appears on the TV screen.

A cursor (▮) indicating the current position of the tape appears on the bar indication. If the cursor does not appear, play the tape a few moments (by pressing ▷ PLAY, ►► FF or ◄◄ REW) until the cursor appears.



2 Push the cursor stick to ←/→ to move the pointer (+) to the point where you want to start playback.

The VCR starts searching and the cursor (▮) moves toward the pointer. When the VCR locates the marked point, playback starts.



To cancel searching

Press ▷ PLAY or ■ STOP.

To turn off the bar indication

Press DISPLAY again.

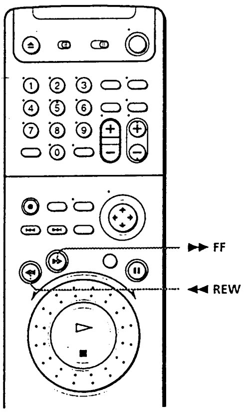
Notes
- The figure on the bar indication represents the total time length of the inserted tape as shown below.
  The total time length may not be displayed correctly for:
  - tapes other than T-60, T-120, or T-160
  - tapes recorded in more than one tape speed mode.

Tape type	Total time length		
	SP	LP	EP
T-60 or shorter	60	120	180
from T-80 to T-140	120	240	360
T-160 or longer	160	320	480

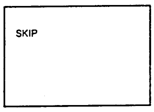
- If you move the pointer (+) on the bar indication during search, the VCR searches for the new reset point.

Skip-searching automatically

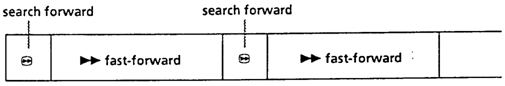
You can spot check a whole tape quickly. At intervals, the VCR skips playback while searching forward or backward.



Press ▶▶ FF (or ◀◀ REW) for more than two seconds during stop. "SKIP" appears on the TV screen.



The VCR searches forward (or backward) for about two minutes on the counter, then fast-forwards (or rewinds) for about ten minutes on the counter. The VCR repeats this operation until it stops at the end (or beginning) of the tape.



To cancel skip-search

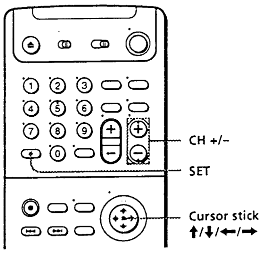
Press ▷ PLAY or ■ STOP.

Note

- The VCR automatically fast-forwards (or rewinds) any portion with no recording.

Creating a favorite channel list with station IDs

You can create your favorite channel list of the TV channels with station IDs. You can store up to 10 channels with station IDs and select the channel from your favorite channel list.

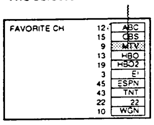


Creating your favorite channel list

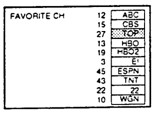
1 Press SET.
The FAVORITE CH screen appears on the TV screen.

2 Press CH +/– to select the station ID you want to replace.
You can also use the cursor stick ↑/↓ instead.

The selected station ID



3 Push the cursor stick to ←/→ to select the station ID you want to set.



4 Repeat steps 2 and 3 to set the station IDs as required.

5 Press SET.

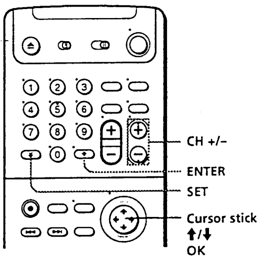
Note

- If the TV channel has no station ID, the channel number appears on the TV screen.

continued

Creating a favorite channel list with station IDs (continued)

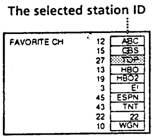
Selecting a channel from your favorite channel list



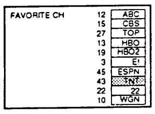
1 Turn on your TV and set it to the video channel.
To choose a channel from a cable box, turn the cable box on.

2 Press SET.
Your FAVORITE CH screen appears on the TV screen.

The selected station ID



3 Press CH +/– to select the station ID you want to select.
You can also use the cursor stick ↑/↓ instead.



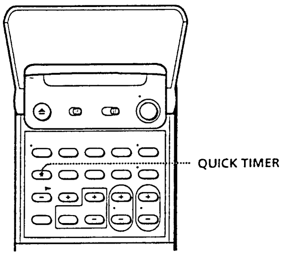
4 Press ENTER.
You can also use the cursor stick (OK) instead.

Note

- If the TV channel has no station ID, the channel number appears on the TV screen.

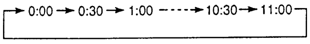
Recording TV programs using the quick timer

After starting recording in the normal way, you can have the VCR stop recording automatically after a specified duration.



1 While recording, press QUICK TIMER once.
The ⊕ indicator appears in the display window.

2 Press QUICK TIMER repeatedly to set the duration.
Each press advances the time in increments of 30 minutes.



The duration decreases minute by minute to 0:00, then the VCR stops recording and turns off automatically.

To extend the duration

Press QUICK TIMER repeatedly to set to the new duration.

To stop while recording

Press ■ STOP.

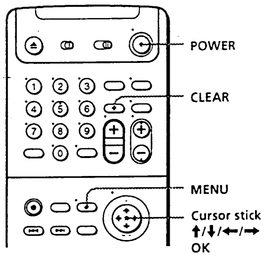
Using the quick timer during stop mode

1 Press QUICK TIMER.

2 Press CH +/– or INPUT SELECT to select the channel you want to record.

3 Press QUICK TIMER repeatedly to set the recording duration.
The recording starts.

Checking/ changing/ canceling timer settings

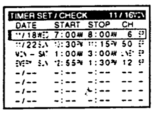


Before you start...

- Turn on your TV and set it to the video channel.

1 Press POWER to turn on the VCR.

2 Press MENU and select TIMER SET/CHECK:



- If you want to change a setting, go on to the next step.
- If you do not need to change the settings, press the cursor stick (OK), then turn off the VCR to return to recording standby.

3 Push the cursor stick to ↑/↓ to select the setting you want to change:

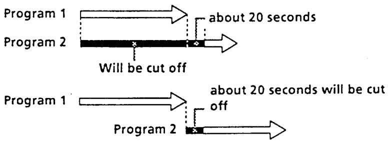
- To change the setting, push the cursor stick to ←/→ to highlight the item you want to change, and push the cursor stick to ↑/↓ to reset it. Then, push the cursor stick to → repeatedly until the cursor appears at the beginning of the line.
- To cancel the setting, press CLEAR.

4 Press the cursor stick (OK).

If any timer settings remain, turn off the VCR to return to recording standby.

When the timer settings overlap

The program that starts first has priority and the second program starts recording only after the first program has finished. If the programs start at the same time, the program listed first in the menu has priority.



Recording stereo and bilingual programs

Recording stereo programs

This VCR automatically receives and records stereo programs. When a stereo program is received, the STEREO indicator lights up. If there is noise in the stereo program, set AUTO STEREO in the ADVANCED OPTIONS menu to OFF. The sound will be recorded in monaural (on both hi-fi and normal audio tracks) but with less noise. For details, see page 82.

Recording bilingual programs

Normally, this VCR records only the main sound. When a SAP (Second Audio Program) is received, the SAP indicator lights up. To record only SAP sound, set TUNER AUDIO in the ADVANCED OPTIONS menu to SAP. For details, see page 82.

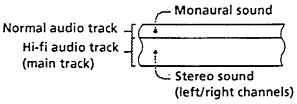
Selecting the sound during playback

Press AUDIO MONITOR to select the sound you want. (The sound being recorded will not change.)

To listen to	On-screen display	Display window
Stereo/main (left and right channels)	STEREO	STEREO
Left channel only	LEFT CH	STEREO
Right channel only	RIGHT CH	STEREO
Monaural	No indicator	No indicator

How sound is recorded on a video tape

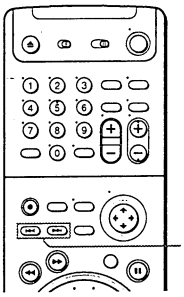
The VCR records sound onto two separate tracks. Hi-fi audio is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



Notes

- To play a tape in stereo, you must use the A/V connections.
- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.
- If the AUDIO MONITOR button does not function, check that AUDIO MIX in the ADVANCED OPTIONS menu is set to OFF.

Searching using the index function

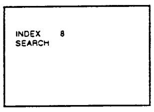


The VCR marks the tape with an index signal at the point where each recording begins. Use these signals as references to find a specific recording. The VCR can search up to 99 index signals ahead of or behind the current position.

1 Insert an indexed tape into the VCR.

2 Press |◀◀/▶▶| INDEX SEARCH repeatedly to specify how many index signals ahead or behind you want to search:

- To search ahead, press ▶▶| INDEX SEARCH.
- To search backwards, press |◀◀ INDEX SEARCH.



The VCR starts searching and the index number on the TV screen counts down to zero. Playback starts automatically from that point.

To stop searching

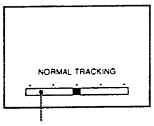
Press ■ STOP.

Adjusting the picture

Adjusting the tracking

Although the VCR automatically adjusts the tracking when playing a tape (the ▨ indicator flashes in the display window, then goes off), distortion may occur if the tape was recorded in poor condition. In this case, manually adjust the tracking.

Press the TRACKING +/– buttons to display the tracking meter. The distortion should disappear as you press one of the two buttons (the ▨ indicator lights up). To resume automatic tracking adjustment, eject the tape and reinsert it.



Tracking meter

About Adaptive Picture Control (APC)

Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set APC to ON in the ADVANCED OPTIONS menu (with the APC indicator in the display window lit). For details, see page 83.

APC playback

The APC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with APC.

APC recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected.

Notes

- Auto tracking adjustment cannot be guaranteed to work with on tapes recorded in the LP mode on other VCRs.
- The APC function does not work if the tape speed is automatically changed from the SP to EP mode during a timer recording, unless the tape has been recorded in the EP mode with the APC function.
- There is a delay of a few seconds before the VCR actually starts recording while the VCR analyzes the tape. To avoid the delay, first set the VCR to recording pause (the APC indicator flashes slowly) and press ● REC to have the VCR analyze the tape (the APC indicator flashes rapidly). After the APC indicator stops flashing, press ❚❚ PAUSE to start recording immediately.
  If you want to start recording quickly without using the APC function, first set the VCR to recording pause (the APC indicator flashes slowly) and press ❚❚ PAUSE to start recording.

Changing menu options

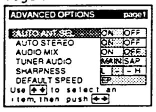
1 Press MENU and select ADVANCED OPTIONS.

2 Push the cursor stick to ↑/↓ to select the option to change, then push the cursor stick to ←/→ to change the setting.

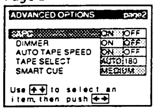
The ADVANCED OPTIONS menu has 2 pages. To select page 2, push the cursor stick to ↓ repeatedly until page 2 appears. To select page 1, push the cursor stick to ↑ repeatedly until page 1 appears.

3 Press the cursor stick (OK) to return to the original screen.

Page 1



Page 2



Menu choices

Initial settings are indicated in bold print.

Menu option	Set this option to
AUTO ANT SEL	**ON** if your TV is connected only to VHF/UHF OUT on the VCR. To play a tape, set the TV to the VCR channel (channel 3 or 4). OFF if your TV is connected to both VHF/UHF OUT and LINE OUT on the VCR. To play a tape, set the TV to the VCR input.
AUTO STEREO	**ON** to receive stereo programs, OFF to reduce noise. The sound changes to monaural.
AUDIO MIX	ON to listen to the sound recorded on hi-fi and normal audio tracks at the same time. The AUDIO MONITOR button will not function. **OFF** to listen to hi-fi and normal audio tracks separately. Select the sound using the AUDIO MONITOR button.
TUNER AUDIO	**MAIN** to record the main sound on both hi-fi and normal audio tracks. SAP to record the SAP (Second Audio Program) sound on both hi-fi and normal audio tracks.
SHARPNESS	L (Low) through H (High) to adjust the sharpness of the picture. L to turn off the sharpness control.
DEFAULT SPEED	**EP** to set the recording tape speed automatically back to EP after recording. SP to set the recording tape speed automatically back to SP after recording. FLOAT to set the recording tape speed to the last position selected from the SP/EP button.

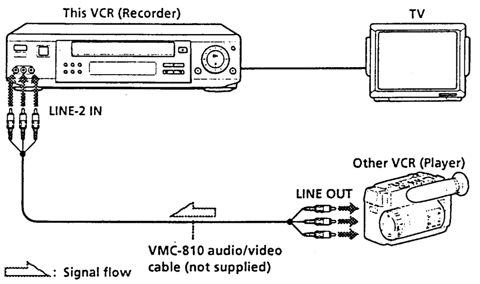
Menu option	Set this option to
APC	**ON** to switch on the APC (Adaptive Picture Control) function and improve picture quality, OFF to switch off APC.
DIMMER	ON to make the display window dim, **OFF** to make it brighter.
AUTO TAPE SPEED	**ON** to change the timer recording tape speed automatically to the EP mode when the remaining tape becomes shorter than the recording time, OFF to keep the tape speed.
TAPE SELECT	**AUTO** or 180 (when using a T-140 or T-180) to select the tape length and display the remaining time correctly.
SMART CUE	**MEDIUM** to set the automatic rewinding time on skip playback to a medium length, SHORT to set to short, LONG to set to long.

Note

- If you set the DEFAULT SPEED option to EP, you can still change the recording tape speed to SP, or vice versa by pressing the SP/EP button only for that program. Next time you record a program, the recording tape speed is automatically set to the position you set in the DEFAULT SPEED option.

Editing with another VCR

How to hook up to record on this VCR



How to hook up to a stereo system

Connect LINE-2 IN AUDIO on this VCR to the audio output jacks on the stereo system, using the RK-C510KS audio cable (not supplied).

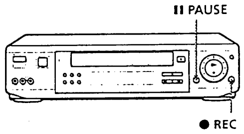
If the other VCR has a CONTROL S OUT jack for synchronized editing

Hook up to record on the other VCR, then connect the VCRs via the CONTROL S jacks. The CONTROL S connection lets you control (pause and release pause) both VCRs from the recording VCR.

Notes

- Make sure you connect the plugs to jacks of the same color.
- If the other VCR is a monaural type and connected to this VCR's LINE-2 IN jacks, connect the audio plug to the AUDIO L (white) jack. The sound is recorded on both right and left channels. When connecting to the AUDIO R (red) jack, the sound is recorded only on the right channel.
- If you connected this VCR to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.
- You can also use the LINE-1 IN jacks instead. If the other VCR is a monaural type, the sound is recorded only on the channel whose jack is connected to the audio plug. To record on both right and left channels, connect the audio plugs to the AUDIO R/L jacks using a VMC-910MS audio/video cable (not supplied).
- If the CONTROL S IN jack is used for S-Link™ (A/V bus control) with a TV, the CONTROL S connection cannot be used for editing.

Operation (when recording on this VCR)



Before you start editing

- Turn on your TV and set it to the video channel.
- Press INPUT SELECT to display "L2" or "L1" in the display window.
- Press SP/EP to select the tape speed, SP or EP.

1. Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.
2. Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press II PAUSE.
3. Press ● REC on this VCR and set it to recording pause.
4. To start editing, press the II PAUSE buttons on both VCRs at the same time.

To stop editing

Press the ■ STOP buttons on both VCRs.

Tips

- To edit more precisely, press the II PAUSE buttons on the VCRs to release pause.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording (Assemble Editing).

Note

- If you start recording following the procedure above, the VCR won't start recording with the APC function. To record a tape with the APC function, press ● REC again during recording pause in step 3 so that the VCR analyzes the tape. Then when you start recording in step 4, press II PAUSE immediately after the APC indicator stops flashing. If you press II PAUSE before the APC indicator stops flashing, the APC function is canceled.

About the SmartFile function

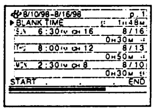
SmartFile allows you to view the contents of your video tape (recording date, channel, etc.) on the TV screen. It is no longer necessary to rewind, fast-forward, or play back a tape to find out what is recorded. You can also locate and start playback of a specific program, or find the position from which you want to start recording by using this list. Program data is stored in the memory of the SmartFile label attached to the tape.

The following functions are possible using SmartFile:

Recording using the SmartFile function (page 88)

To use the SmartFile function, attach the SmartFile label to the tape. If you record a program on a tape with a SmartFile label, the contents will appear on the SmartFile search list. With the SmartFile list, you can also easily find the beginning of the available recording space.

SmartFile search list

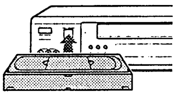


Selecting and playing a program (page 93)

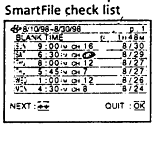
To play back a recorded program, select the program you want to watch using the SmartFile search list. The VCR locates the program and playback starts automatically.

Checking the contents of a tape (page 94)

When you bring the SmartFile label close to the SMARTFILE sensor on the VCR, a summary of the recorded programs appears in the SmartFile check list. It is not necessary to insert the tape into the VCR and press ▷ PLAY to find out what is recorded on it. This feature allows you to easily find the program you want to watch, or to quickly find a tape with enough recording space.



SmartFile check list



Labelling a recorded program and tape (page 95)

You can attach an electronic "label" to the video tape and it's programs on the SmartFile list. Labelling the recorded programs enables you to find a program easily when you want to play it back. Also, once you label a program which you set to record regularly (i.e. everyday, same day of a week, etc.), the VCR recognizes the label and will automatically label all future recordings of the same program.

Protecting a recorded program (page 100)

You can protect a recorded program from accidental over-recording or erasure.

Erasing the data of an unwanted program (page 102)

By erasing a program from the SmartFile list, the VCR will record over the unwanted program.

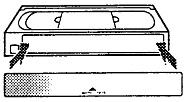
Storing program data from the DSS receiver (Program Data Download) (page 103)

If you connect a DSS receiver equipped with the Program Data Download function, you can store the program and category name transmitted from the DSS on a SmartFile tape.

Recording using the SmartFile function

To use the SmartFile function, attach the SmartFile label to the spine of the cassette tape. If you record a program on a tape with a SmartFile label, program data, such as the date and channel, is automatically stored in the memory of the SmartFile label.

Attaching the SmartFile label to the cassette tape



To use the SmartFile function, attach the supplied SmartFile label to the cassette tape. Remove any stains or dirt from the surface of the spine of the tape. Then, holding both edges of the SmartFile label so that it doesn't bend, attach it along the guide line to the spine of the cassette tape. This tape is henceforth referred to as a SmartFile tape.

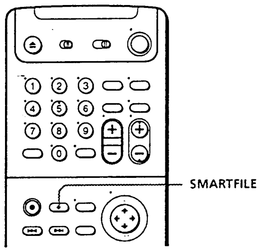
Note on the purchase of SmartFile labels

You can buy SmartFile labels through the mail. For details, please consult your nearest Sony dealer.

Notes

- The SmartFile label is equipped with a memory chip. The memory chip may be damaged and cannot be used when you:
  - twist or fold the SmartFile label.
  - remove the SmartFile label and re-attach it to a tape.
  - attach more than one SmartFile label to a tape.
  - attach some metal, or sticker which has metal, to the SmartFile label.
  - write too strongly on the SmartFile label using a ballpoint pen or similar sharp instrument.
  - disassemble or remodel a label.
- Do not leave the SmartFile label in a place subject to excessive dust or dirt, direct sunlight, humidity, mildew, strong magnetism, or near heat sources.
- If you attach the SmartFile label to a short length tape, such as T-30 or shorter, you cannot use the SmartFile function.

Recording a program on the SmartFile tape

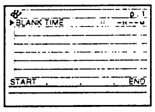


When recording a program on the SmartFile tape, no matter what method you use to record the program (normal recording, VCR Plus+ recording, etc.), program data (date, channel, recording start time, etc.) is stored in the memory of the SmartFile label. The SmartFile label can contain up to 12 programs' data. When the number of the stored programs goes over 12, the oldest program data is erased from the SmartFile list. However, a program which lasts less than about 15 minutes in EP mode or about 5 minutes in SP mode cannot be stored in the memory.

When you record a program on the SmartFile tape which already contains program data, see "Recording after locating the Blank Time space" on page 91.

Before you start...

- Turn on your TV and set it to the video channel.



1. Insert a SmartFile tape with its safety tab in place.

   The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

2. Press SMARTFILE.

   The SmartFile search list disappears.

3. Start recording a program.

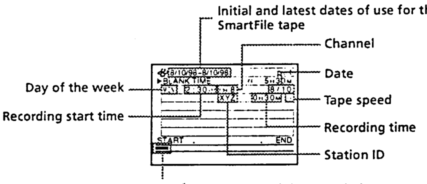
Tips

- You can protect a recorded program from accidental over-recording or erasure (see page 100).
- If you press the ❚❚ PAUSE button one or more times during recording, thereby creating short lengths of recorded time between such pauses, program data may not be stored in the SmartFile label.

continued

To check the information of a recorded program

Press SMARTFILE. The SmartFile search list appears. The recording day of the week, start time, channel, date, station ID, recording time, and tape speed appear on the list. The longest space which doesn't have any program data (Blank Time space) appears as "BLANK TIME."



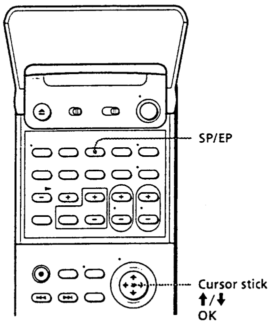
Tip

- You can manually name a recorded program and select the category. You can also name the SmartFile tape. See pages 95 through 99.

Notes

- If you don't set the clock or the clock isn't set to the correct time, the recording time won't be stored correctly on the SmartFile list.
- When you record a program using the normal recording mode while the CABLE MOUSE option is set to ON in the CABLE BOX CONTROL menu, the channel number is stored as "CH---."
- When you set the AUTO TAPE SPEED option to ON in the ADVANCED OPTIONS menu, and the tape speed automatically changes from SP to EP during recording, the VCR displays the entire recording time converted in SP mode to the SmartFile list.
- The recording time length in the SmartFile list is an estimation and may be slightly different from the actual recorded time length.

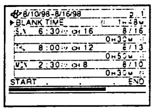
Recording after locating the Blank Time space



The SmartFile function identifies not only the largest amount of available blank space, but also recorded material that doesn't have corresponding program data stored in the SmartFile label. The longest available recording space (including programs that are not stored on the SmartFile label) is referred to as "Blank Time space." You can locate the beginning of the Blank Time space for recording. If there is a recorded program after the Blank Time space, the VCR will over-record on that program unless you stop recording. If there is a program you want to prevent from being recorded over or erased, protect that program before you start recording another program (see pages 100 through 101).

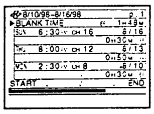
Before you start...

- Turn on your TV and set it to the video channel.



1. Insert a SmartFile tape with its safety tab in place.

   The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen. The Blank Time space appears in the "BLANK TIME" row.



2. Push the cursor stick to ↑/↓ to select BLANK TIME.

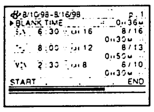
   BLANK TIME is on page 1 of the SmartFile search list.

continued

Recording using the SmartFile function (continued)

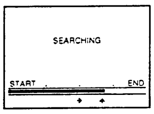
3 Press SP/EP to select the tape speed, SP or EP.

The BLANK TIME changes according to the selected tape speed. Select a tape speed that matches the length of the program you want to record.



4 Press the cursor stick (OK).

The VCR goes to the beginning of the Blank Time space and stops.

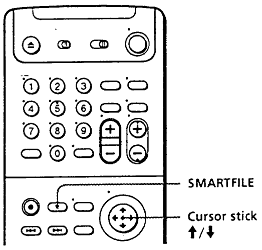


5 Start recording.

Notes

- If a newly recorded program overlaps a stored program, the stored program information is erased from the SmartFile list when:
  - the stored program is over-recorded for more than about 15 minutes in EP mode and about 5 minutes in SP mode.
  - the remaining length of the stored program becomes less than about 15 minutes in EP mode and about 5 minutes in SP mode.
- You may not be able to locate the beginning of the Blank Time space correctly in the above step 4 when:
  - the SmartFile tape contains one or more short length (less than about 15 minutes in EP mode and about 5 minutes in SP mode) recorded programs of which program data are not stored in the SmartFile label.
  - the SmartFile tape is damaged or dirty.

Selecting and playing a program



You can automatically locate and start playback of a program recorded on the SmartFile tape. Select a program in the SmartFile search list. The SmartFile search list can contain up to 12 programs.

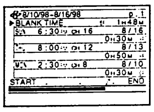
Before you start...

- Turn on your TV and set it to the video channel.

1 Insert a SmartFile tape.

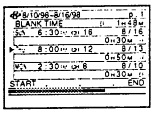
The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

If a SmartFile tape is already inserted, press SMARTFILE.



2 Push the cursor stick to ↑/↓ to select a program.

Pushing the cursor stick to ↑/↓ repeatedly will turn the pages.



3 Press the cursor stick (OK).

The VCR starts searching for the beginning of the selected program. Playback starts automatically from that point.

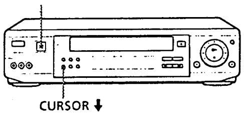
To stop searching

Press ■ STOP.

Note

- You may not be able to locate the beginning of the selected program correctly when:
  - the SmartFile tape contains one or more short length (less than about 15 minutes in EP mode and about 5 minutes in SP mode) recorded programs of which program data are not stored in the SmartFile label.
  - the SmartFile tape is damaged or dirty.

Checking the contents of a tape



You can display the program data list of a SmartFile tape on the TV screen. It is not necessary to insert the tape into the VCR. This feature allows you to quickly find a specific program or to find a tape with enough recording space. The SmartFile check list can contain up to 12 programs.

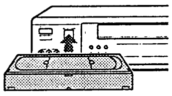
Before you start...

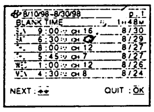
- Turn on your TV and set it to the video channel.

1 Hold the label side of the SmartFile tape close to the SmartFile sensor.

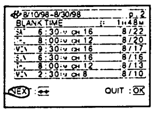
Slowly bring the center of the label within 3 cm of the SmartFile sensor.

There is a short beep, the SMARTFILE indicator lights up, and the SmartFile check list appears.





2 Press CURSOR ↓ repeatedly to turn the pages.



Tips

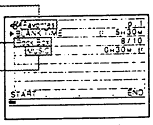
- The SmartFile check list automatically disappears after about three minutes of nonuse.
- If you press a button other than SP/EP or the cursor stick (OK), the SmartFile check list disappears.
- You can turn the pages by pushing the cursor stick to ↑/↓ on the remote commander.

Notes

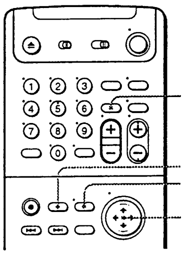
- You cannot display the SmartFile check list while:
  - you display the SmartFile list of a different SmartFile tape inserted into the VCR.
  - you display any other menu.
- If the SmartFile check list doesn't appear on the TV screen, try again by drawing the SmartFile tape away from the SmartFile sensor at least 5 cm, then bring it back to within 3 cm of the sensor.

Labelling a recorded program and tape

You can electronically "label" a program and select a category, such as SPECIAL or MOVIE, for a recorded program in the SmartFile list. You can also label a tape. Up to 18 characters can be input for a program and tape label.



Labelling a recorded program and selecting a category

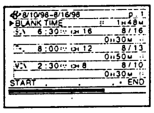


Before you start...

- Turn on your TV and set it to the video channel.

1 Insert a SmartFile tape.

The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

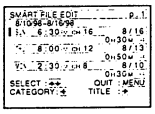


2 Press SMARTFILE.

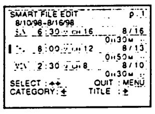
The SmartFile search list disappears.

continued

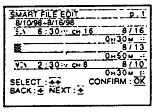
3 Press MENU and select SMART FILE EDIT.
The SMART FILE EDIT menu appears.



4 Push the cursor stick to ↑/↓ to select a program.

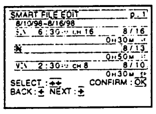


5 Push the cursor stick to →.
The cursor moves to the program label input position.

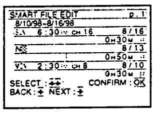


6 Label the program.

❶ Push the cursor stick to ↑/↓ to select a character.
Each time you push the cursor stick to ↓, the character changes as shown below.
A → B → ... → Z → symbol → 0 → 1 → ... 9 → a → b → ... → z → (blank space)
If you make a mistake, press CLEAR.

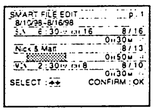


❷ To set the next character, push the cursor stick to →.
The cursor moves to the next position.

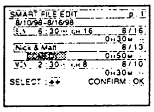


❸ Repeat steps ❶ and ❷ to label the program.

7 Press the cursor stick (OK).



8 Push the cursor stick to ↑/↓ to select a category.
Each time you push the cursor stick to ↓, the category changes as shown below.
SPECIAL → MOVIE → NEWS → SHOW → SPORTS → KIDS → MUSIC → ARTS → SERIES → EDUCATI (education) → HOBBY → SHOPPIN (shopping) → VARIETY → COMEDY → DRAMA → DAYTIME → HOW TO → OTHERS → (blank)



9 Press the cursor stick (OK).
The program name and a selected category are stored.

10 Press MENU.
The menu disappears.

To erase the program label
Press CLEAR after step 4 above. The program label is erased and the recording start time and channel number reappear.

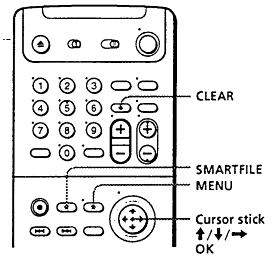
To erase the selected category
Press CLEAR in step 8 above. The selected category is erased and the space becomes blank.

To label a regularly scheduled timer-recorded program
Once you label a program which is set to record regularly (i.e. everyday, same day of the week, etc.) in VCR Plus+ or timer recording mode, the VCR recognizes the label and will automatically label all future recordings of the same program. However, if you change the program label and category several times, the VCR may automatically label only the last program of which the program label and category are changed.

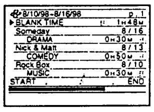
continued

Labelling a tape

Before you start...
- Turn on your TV and set it to the video channel.

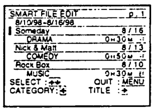


1 Insert a SmartFile tape.
The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

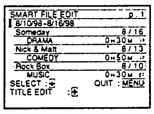


2 Press SMARTFILE.
The SmartFile search list disappears.

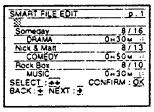
3 Press MENU and select SMART FILE EDIT.
The SMART FILE EDIT menu appears.



4 Push the cursor stick to ↑ to select the tape title.

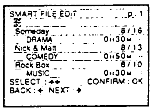


5 Push the cursor stick to →
The cursor moves to the tape title input position.

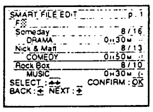


6 Label the tape.

❶ Push the cursor stick to ↑/↓ to select a character.
Each time you push the cursor stick to ↓, the character changes as shown below.
A → B → ... → Z → symbol → 0 → 1 → ... 9 → a → b → ... → z → (blank space)
If you make a mistake, press CLEAR.

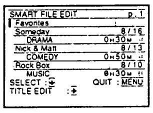


❷ To set the next character, push the cursor stick to →.
The cursor moves to the next position.



❸ Repeat steps ❶ and ❷ to label the tape.

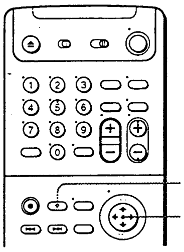
7 Press the cursor stick (OK).
The tape title is stored.



8 Press MENU.
The menu disappears.

To erase the tape title
Press CLEAR after step 4 above. The tape title is erased and the recording date reappears. When you want to erase the recording date from the tape title column, press CLEAR again.

Protecting a recorded program



You can protect a recorded program using the SmartFile function from accidental over-recording or erasure. When you start recording from a position prior to the protected program, the recording stops automatically before the protected program.

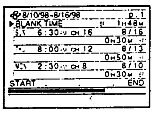
Before you start...

- Turn on your TV and set it to the video channel.

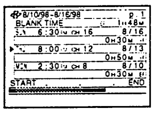
1 Insert a SmartFile tape.

The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

If the SmartFile tape is already in the VCR, press SMARTFILE.

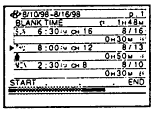


2 Push the cursor stick to ↑/↓ to select the program you want to protect.



3 Push the cursor stick to →.

The 🔒 indicator appears to the left of the selected program and the program becomes protected.



4 Press SMARTFILE.

The SmartFile search list disappears.

To unlock the protected program

Push the cursor stick to ← in step 4 above. The 🔒 indicator disappears and you can record over this program.

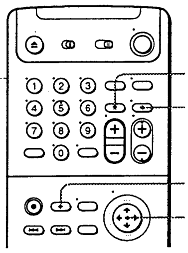
Tips

- When you start recording from a position prior to the protected program, the recording automatically stops no more than about three minutes in SP mode before the beginning of the protected program.
- If you protect a program just after the Blank Time space, BLANK TIME becomes shortened by about eight minutes in EP mode.
- If you try to record on a SmartFile tape containing a protected program, a message indicating that there is a protected program on this tape appears on the TV screen.

Notes

- When you record another program just after a protected program, locate the beginning of the Blank Time space by following the instructions in "Recording after locating the Blank Time space" on page 91. Otherwise, if the recording start point overlaps the protected program, the VCR may over-record the protected program.
- If the VCR Plus+ or timer recording program overlaps the protected program, the VCR automatically stops recording before the protected program and ejects the tape.
- If you insert a SmartFile tape which contains a protected program or protect a program for the first time on a new tape, the VCR will analyze the position of the protected program for a few seconds. You cannot operate the VCR while the VCR is analyzing the tape.
- If the SmartFile list contains 12 protected programs, the next program you record won't be stored in the SmartFile list.

Erasing the data of an unwanted program



You can erase an unwanted program from the SmartFile list. When you erase a program from the list, that portion of tape is subject to Blank Time space priority.

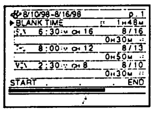
Before you start...

- Turn on your TV and set it to the video channel.

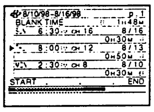
1 Insert a SmartFile tape.

The VCR turns on, the SMARTFILE indicator lights up, and the SmartFile search list automatically appears on the TV screen.

If the SmartFile tape is already inserted in the VCR, press SMARTFILE.



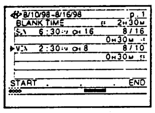
2 Push the cursor stick to ↑/↓ to select a program you want to erase from the list.



3 Press CLEAR.

The selected program is erased from the SmartFile list.

If you erase a program by mistake, press DISPLAY to make the program reappear.



4 Press SMARTFILE.

The SmartFile search list disappears.

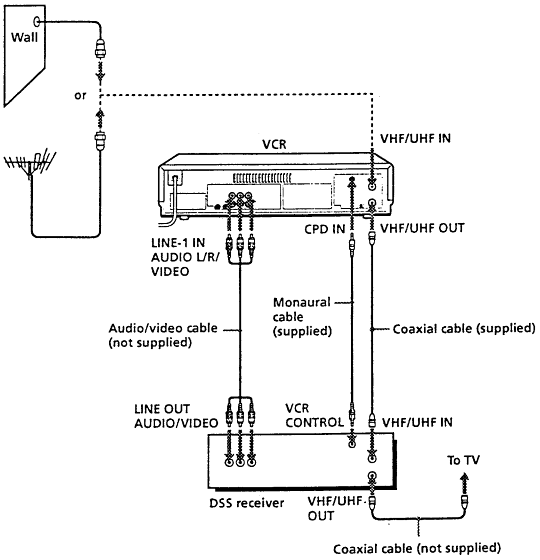
Note

- You cannot erase a protected program from the SmartFile list. You have to first unlock the protected program by following the instructions in "To unlock the protected program" on page 101, then erase that program from the list.

Storing program data from the DSS receiver (Program Data Download)

If you connect a DSS receiver equipped with the Program Data Download function and use the timer recording of the DSS receiver, the program and category name transmitted from the DSS are stored on the SmartFile tape.

How to hook up to the DSS receiver



continued

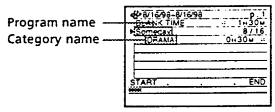
Storing program data from the DSS receiver (Program Data Download) (continued)

Setting up the DSS receiver

You have to set the VCR brand number on the DSS receiver. For example, select "99" in the VCR SELECT menu to use a Sony VCR with the SmartFile function. For details, refer to the instruction manual of your DSS receiver.

Storing program data on the SmartFile tape

When you record a DSS program using the DSS receiver's timer, the program and category name are automatically stored on the SmartFile tape.

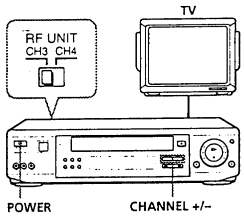


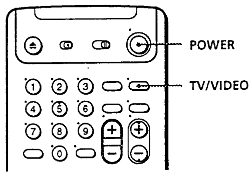
Notes
- Do not operate the VCR, the DSS receiver, and any other equipment connected to these units for at least two minutes after timer recording starts. If you operate these equipment immediately after timer recording starts, the correct program data may not be sent from the DSS receiver.
- When you use the VCR's timer for recording, program data from the DSS receiver is not stored on the SmartFile tape.

General setup information

Setting the RF unit

When connecting the VCR to the TV using only the antenna cable, you must set the RF UNIT switch on the rear of the VCR so that the TV can receive the correct signal from the VCR.





1. Set the RF UNIT switch on the rear of the VCR to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel.
2. Press POWER to turn on the VCR.
3. Press TV/VIDEO to turn on the VIDEO indicator in the display window.
4. Press CHANNEL +/– to display a channel number in the display window. Select an active channel number in your area.
5. Turn on your TV and set it to the channel you selected in step 1 (channel 3 or 4).

   The selected TV channel broadcast appears on the TV screen. If the channels change when you press CHANNEL +/– on the VCR, you have made the correct setting.

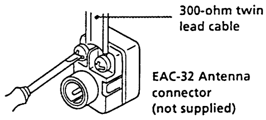
   Whenever you use the VCR, set the TV to the channel selected in step 1.

continued

General setup information (continued)

Attaching the external antenna connector

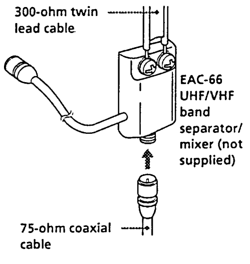
When using a 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-32 antenna connector (not supplied) to connect the antenna to the VCR.



1. Loosen the screws on the antenna connector.
2. Wind the twin leads around the screws on the antenna connector.
3. Retighten the screws.

Attaching a UHF/VHF band mixer

When using both 75-ohm coaxial cable and 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-66 UHF/VHF band separator/mixer (not supplied) to connect the antenna to the VCR.

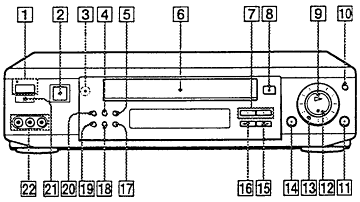


1. Loosen the screws on the mixer.
2. Wind the twin leads around the screws on the mixer.
3. Retighten the screws.
4. Connect the 75-ohm coaxial cable to the mixer.

Index to parts and controls

Refer to the pages indicated in parentheses ( ) for details.

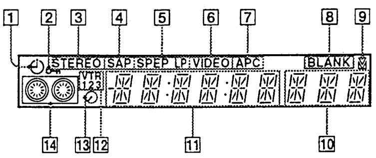
Front panel



1 POWER switch/indicator (62, 105)
2 SmartFile sensor (94)
3 SMARTFILE indicator (89, 94)
4 INPUT SELECT button (56, 58, 85)
5 EASY SET UP button (12, 15, 18, 21, 25, 28)
6 Tape compartment
7 CHANNEL/TRACKING +/– buttons (56, 81, 105)
8 ≜ EJECT button (54)
9 ▷ PLAY button (53, 67)
10 JOG button (68)
11 ● REC (record) button (56, 85)
12 ■ STOP button (54, 85)
13 Shuttle ring (57, 68)
14 ❚❚ PAUSE button (54, 85)
15 ►► FF (fast forward) button (54, 67)
16 ◄◄ REW (rewind) button (54, 67)
17 COMMAND MODE button (6)
18 OK button (32, 92)
19 CURSOR ↓ button (94)
20 SMARTFILE button (89)
21 Remote sensor (5)
22 LINE-2 IN VIDEO/AUDIO L/R jacks (84)

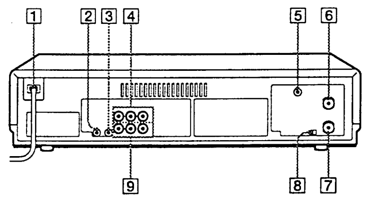
continued

Display window



1 Timer indicator (62)
2 Child Lock indicator (63)
3 STEREO indicator (78)
4 SAP (Second Audio Program) indicator (78)
5 Tape speed indicator (56)
6 VIDEO indicator (57, 105)
7 APC (Adaptive Picture Control) indicator (81)
8 BLANK indicator (91)
9 Tracking indicator (81)
10 Line/channel indicator (56, 85)
11 Time counter/clock (54)
12 Command mode indicator (6)
13 Remaining time indicator (57)
14 Tape/recording indicator (56)

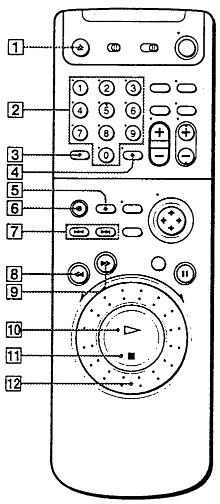
Rear panel



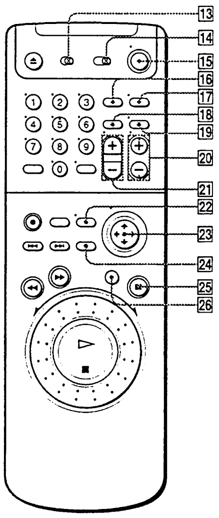
1 AC power cord (8)
2 S LINK (CONTROL S IN) jack (10, 84)
3 CABLE BOX CONTROL (CONTROL S OUT) jack (11, 24)
4 LINE-1 IN AUDIO L/R/VIDEO jacks (24, 84)
5 CPD (Control and Program Data) IN jack (103)
6 VHF/UHF IN connector (11, 14, 17, 20, 24, 27)
7 VHF/UHF OUT connector (11, 14, 17, 20, 24, 27)
8 RF (Radio Frequency) UNIT switch (105)
9 LINE OUT AUDIO L/R/VIDEO jacks (9)

continued

Remote commander



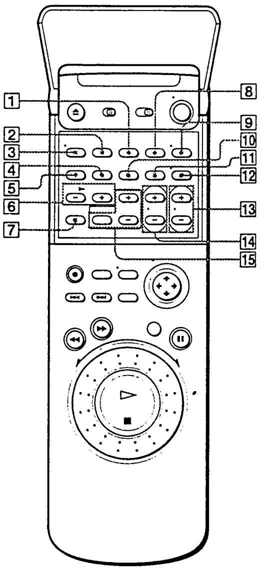
1 ≜ EJECT button (54)
2 Number buttons (46, 51)
3 SET button (62, 73)
4 ENTER button (46, 51)
5 SMARTFILE button (89, 100)
6 ● REC (record) button (56)
7 ⏮/⏭ INDEX SEARCH buttons (80)
8 ◀◀ REW (rewind) button (54, 67)
9 ▶▶ FF (fast forward) button (54, 67)
10 ▷ PLAY button (53)
11 ■ STOP button (54)
12 Shuttle ring (57, 68)



13 TV/VIDEO switch (5)
14 COMMAND MODE switch (6)
15 POWER switch (6, 62, 65, 105)
16 VCR Plus+ button (61)
17 TV/VIDEO button (57, 105)
18 CLEAR button (62, 76)
19 DISPLAY button (54, 70)
20 CH (channel) +/– buttons (56)
21 VOL (volume) +/– buttons (6)
22 MENU button (32)
23 Cursor stick (32, 91)
↑/↓/←/→
OK
24 SMART CUE button (54)
25 ❚❚ PAUSE button (54)
26 JOG button/indicator (68)

continued

Remote commander, with top cover opened

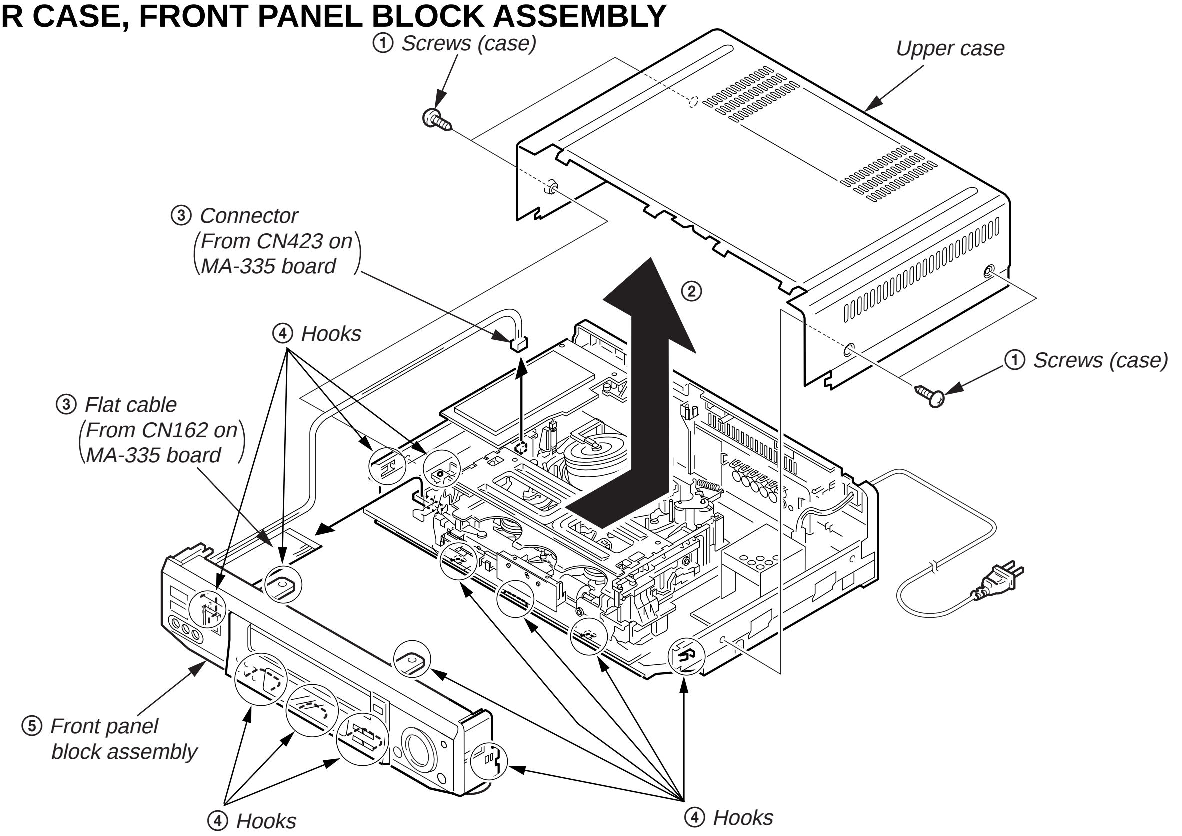


1. SP (Standard Play)/EP (Extra Play) button (56)
2. TAPE RETURN button (68)
3. AUDIO MONITOR button (78)
4. COUNTER RESET button (54)
5. QUICK TIMER button (75)
6. ▮▶ SLOW +/– buttons (67)
7. × 2 button (67)
8. INPUT SELECT button (56, 58, 85)
9. TV/VIDEO button (57, 105)
10. COUNTER/REMAIN button (57)
11. CLEAR button (62, 76)
12. DISPLAY button (54, 70)
13. CH (channel) +/– buttons (56)
14. VOL (volume) +/– buttons (6)
15. Receiver operation buttons
    RECEIVER VOL (volume) +/– buttons (5)
    MUTING button (5)

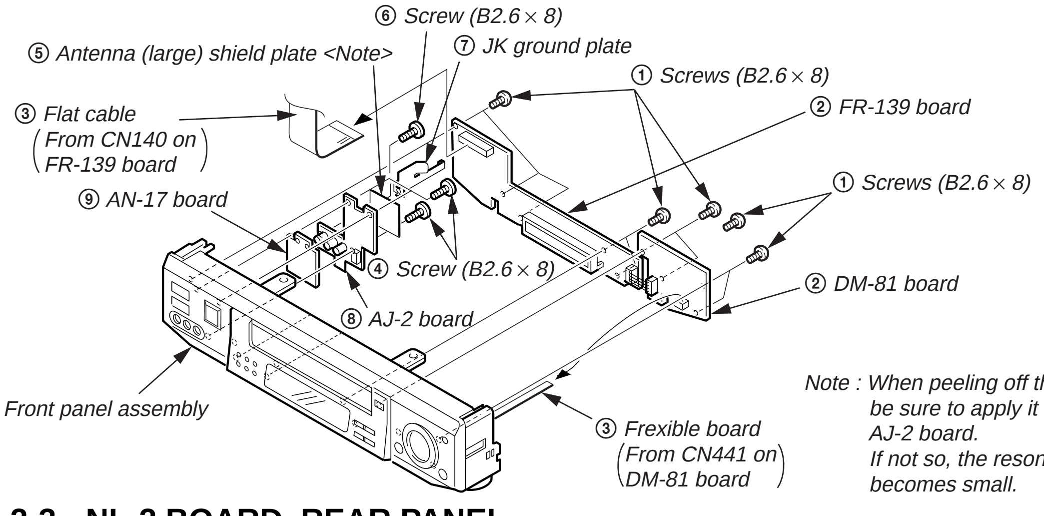
SECTION 2
DISASSEMBLY

NOTE: Follow the disassembly procedure in the numerical order given.

2-1. UPPER CASE, FRONT PANEL BLOCK ASSEMBLY

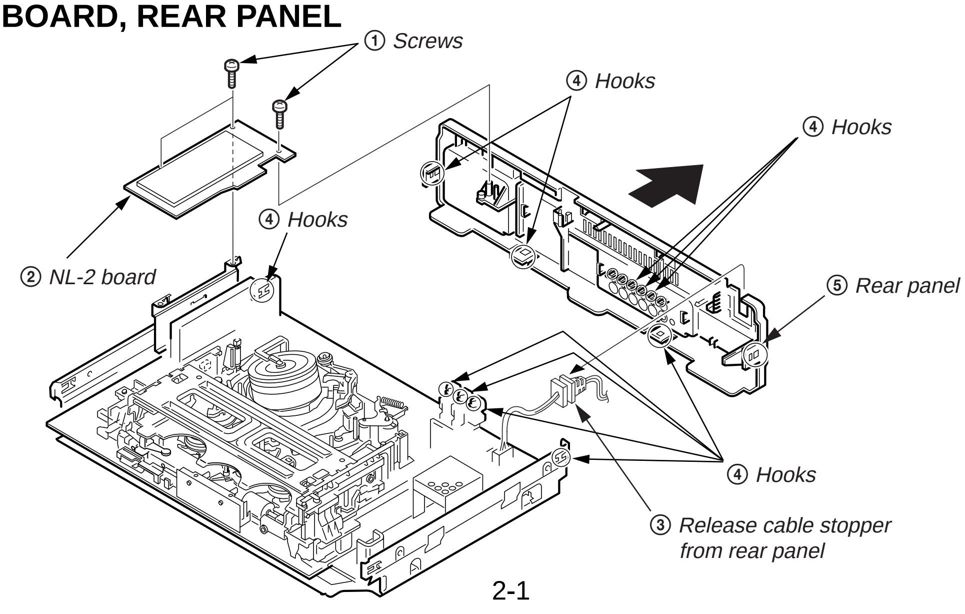


2-2. FR-139, DM-81, AJ-2, AN-17 BOARDS



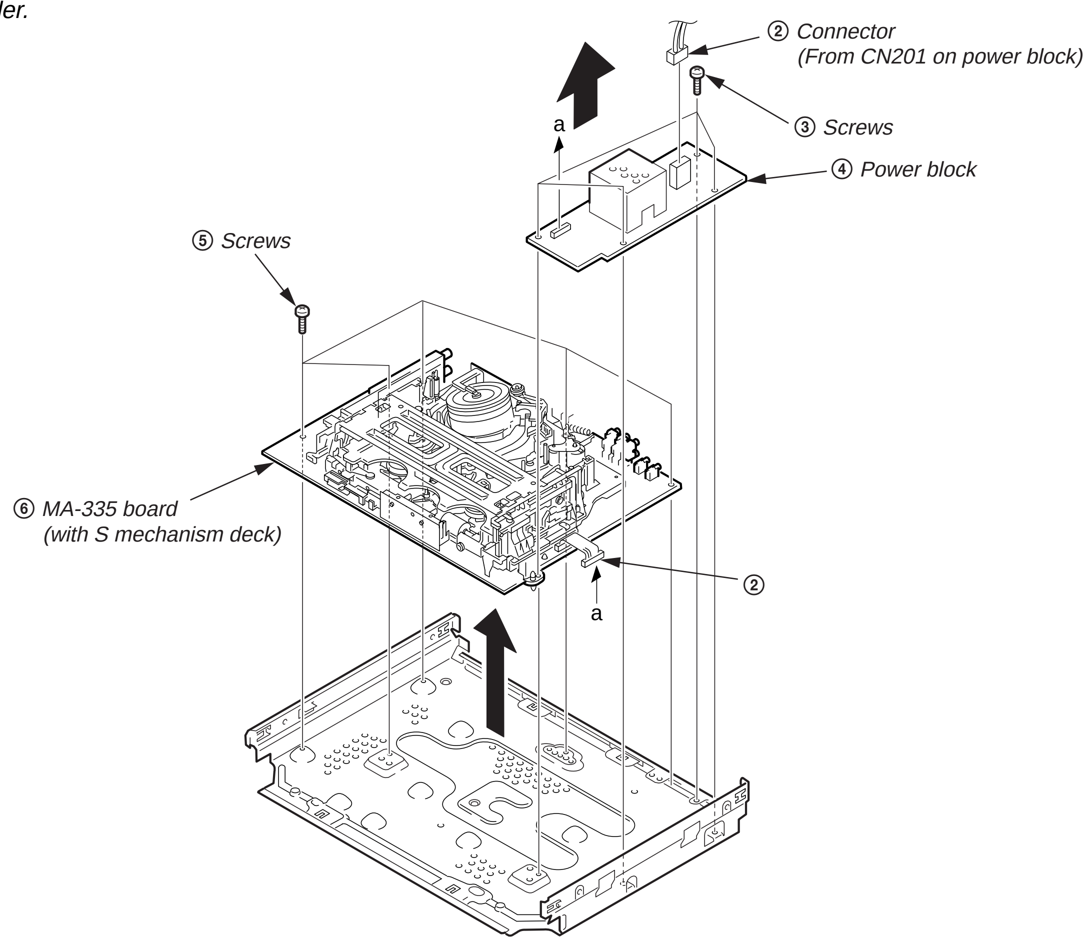
Note : When peeling off the antenna (large) shield plate, be sure to apply it to the original position on the AJ-2 board.
If not so, the resonance level of AN-17 board becomes small.

2-3. NL-2 BOARD, REAR PANEL

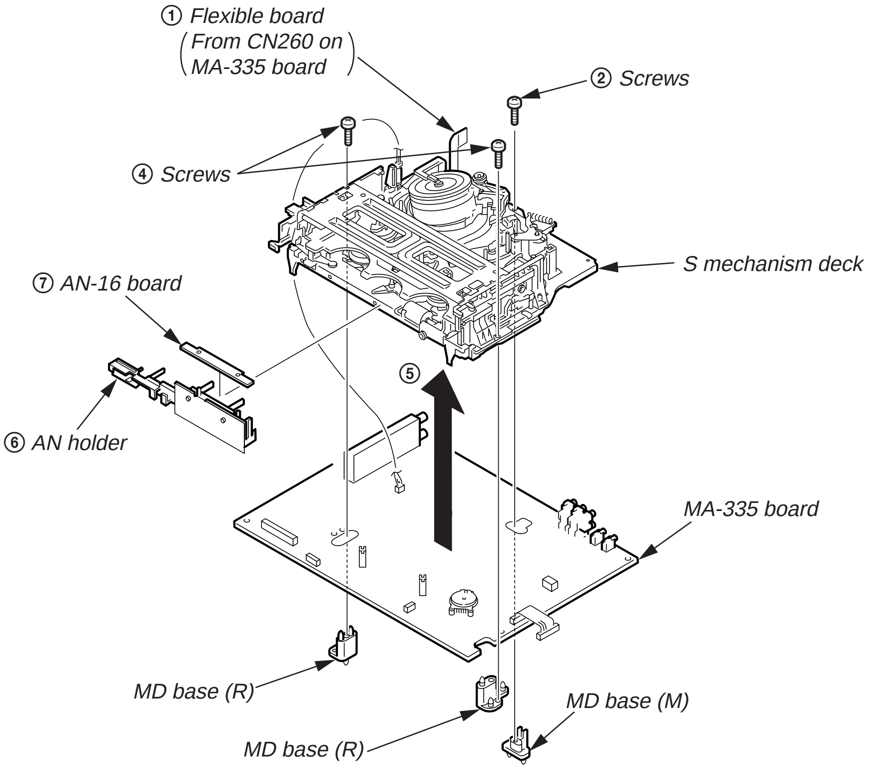


2-4. POWER BLOCK, MA-335 BOARD (WITH S MECHANISM DECK)

① *Remove two screws securing NL holder and remove NL holder.*

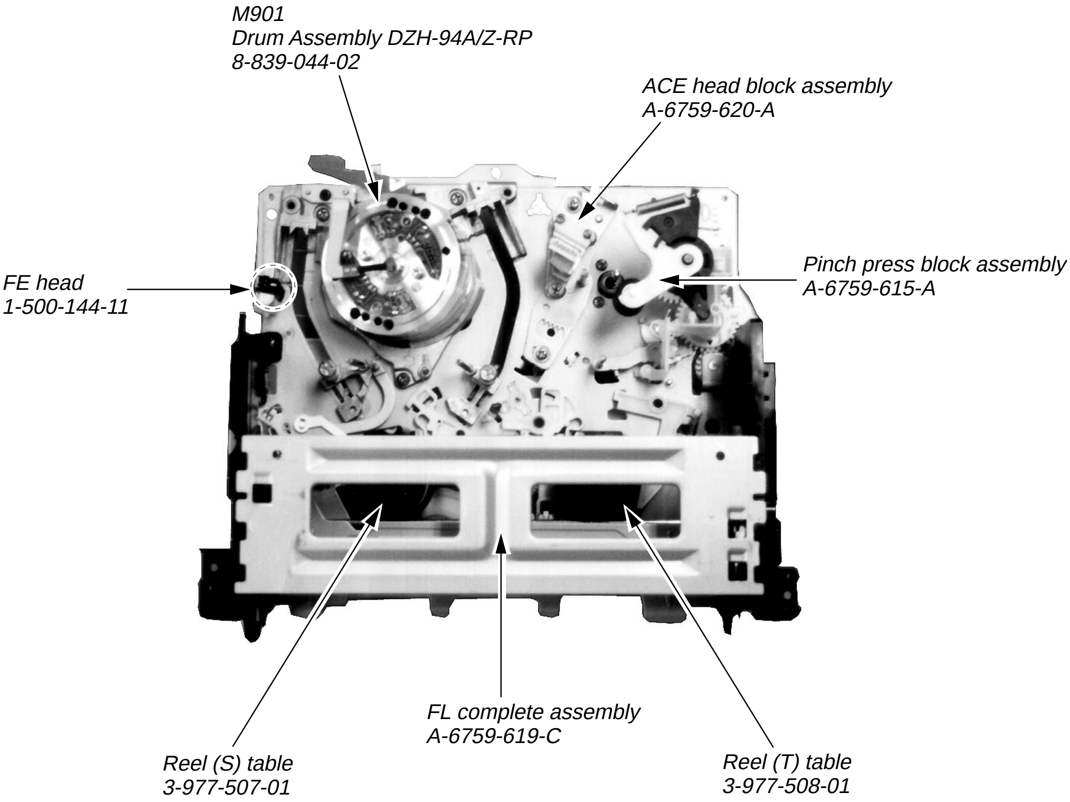


2-5. AN-16 BOARD, S MECHANISM DECK

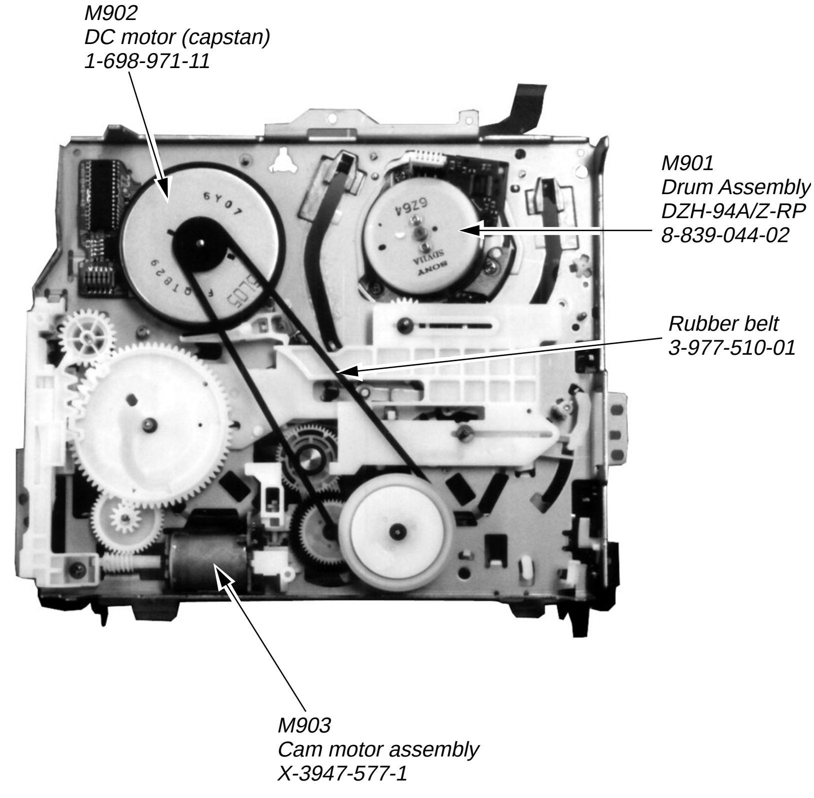


2-6. INTERNAL VIEWS

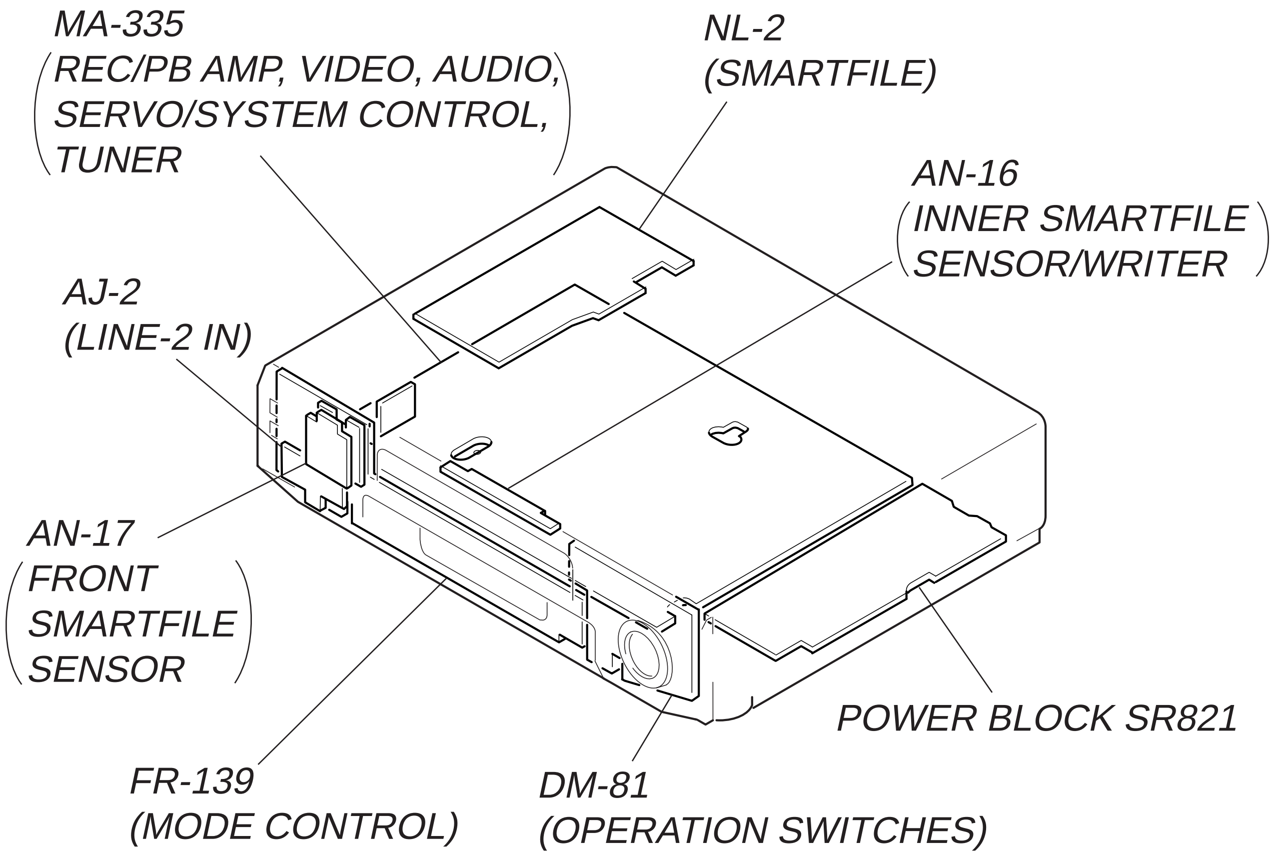
— Top View —



— Bottom View —

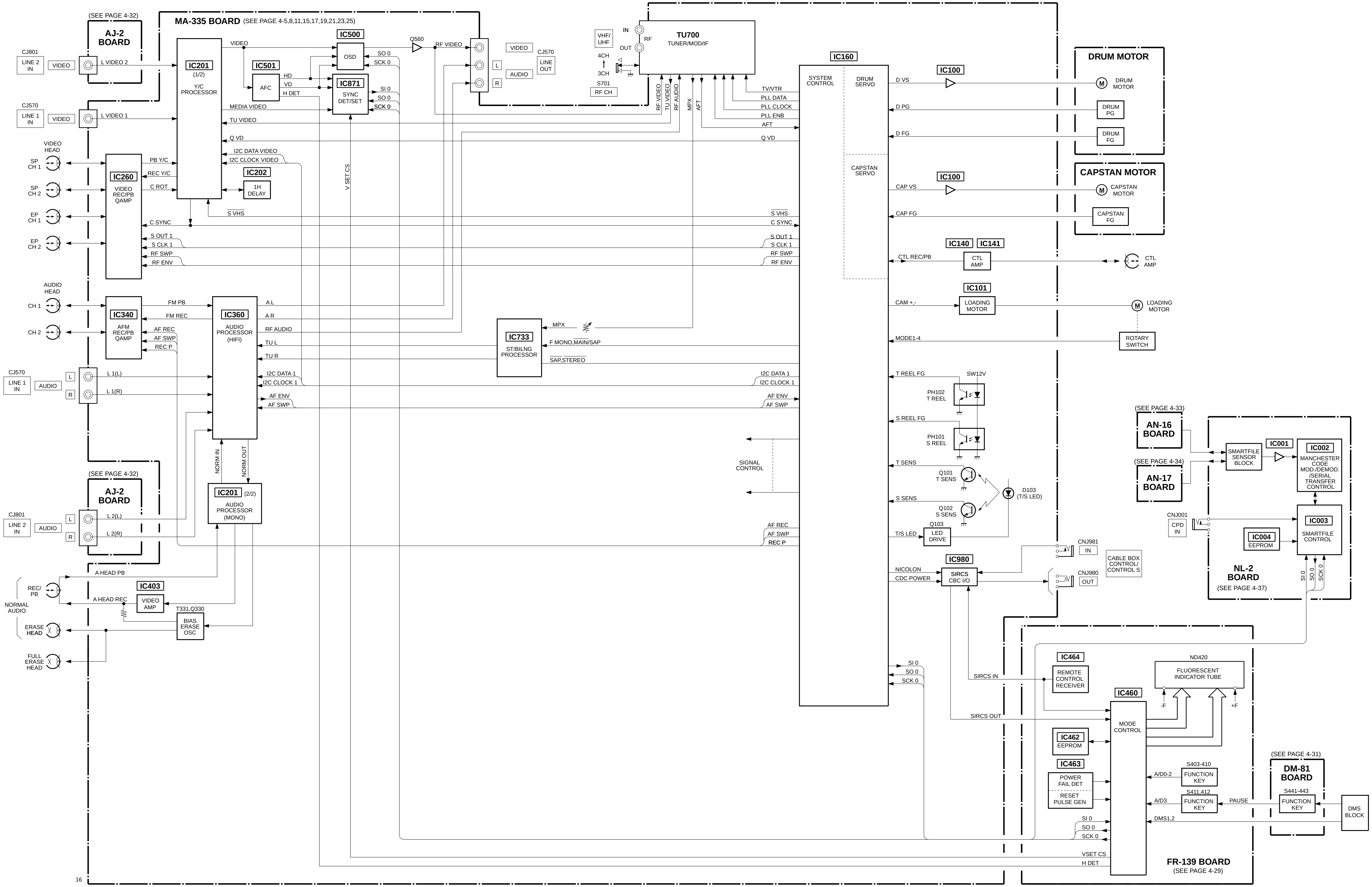


2-7. CIRCUIT BOARDS LOCATION

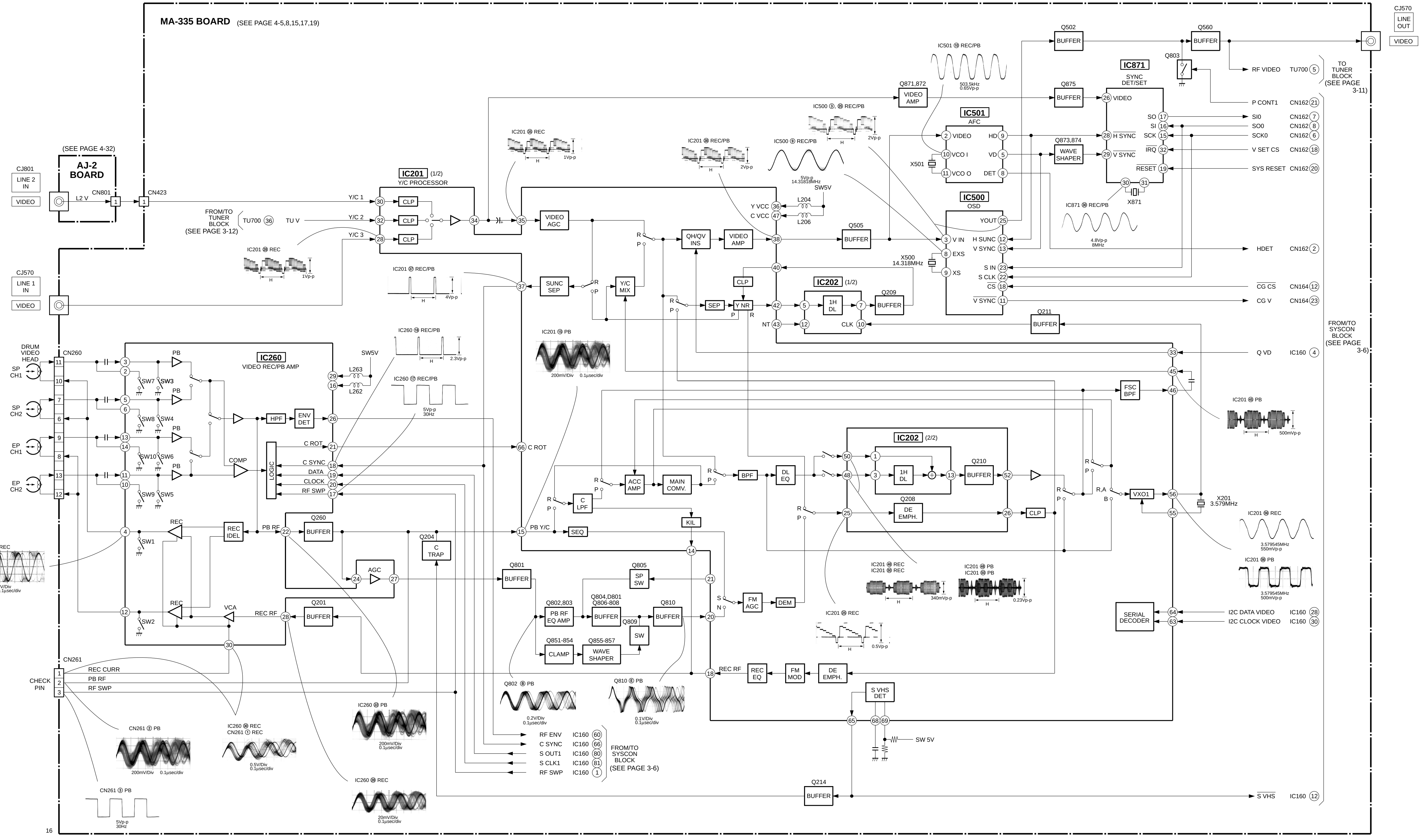


SECTION 3
BLOCK DIAGRAMS

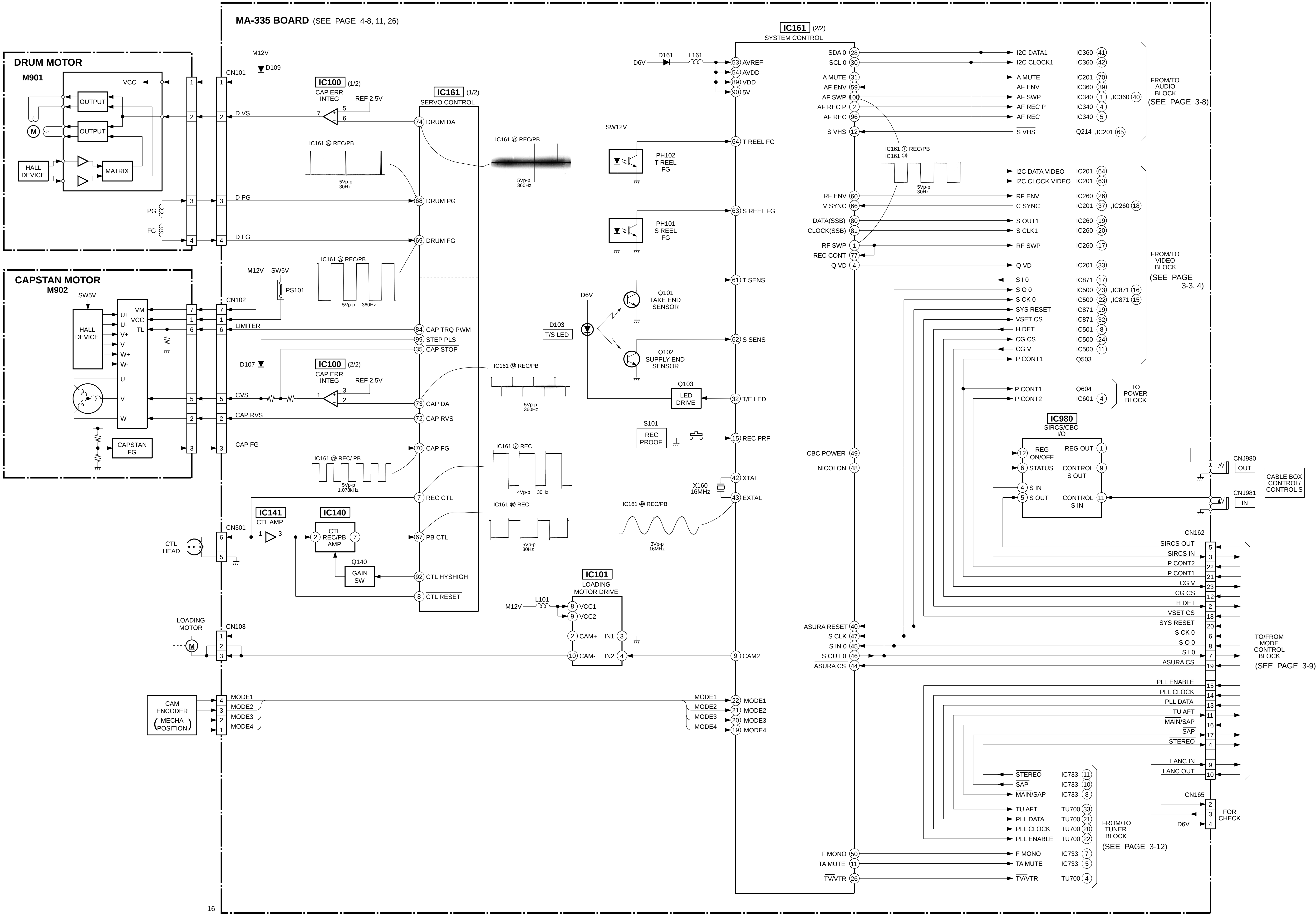
3-1. OVERALL BLOCK DIAGRAM



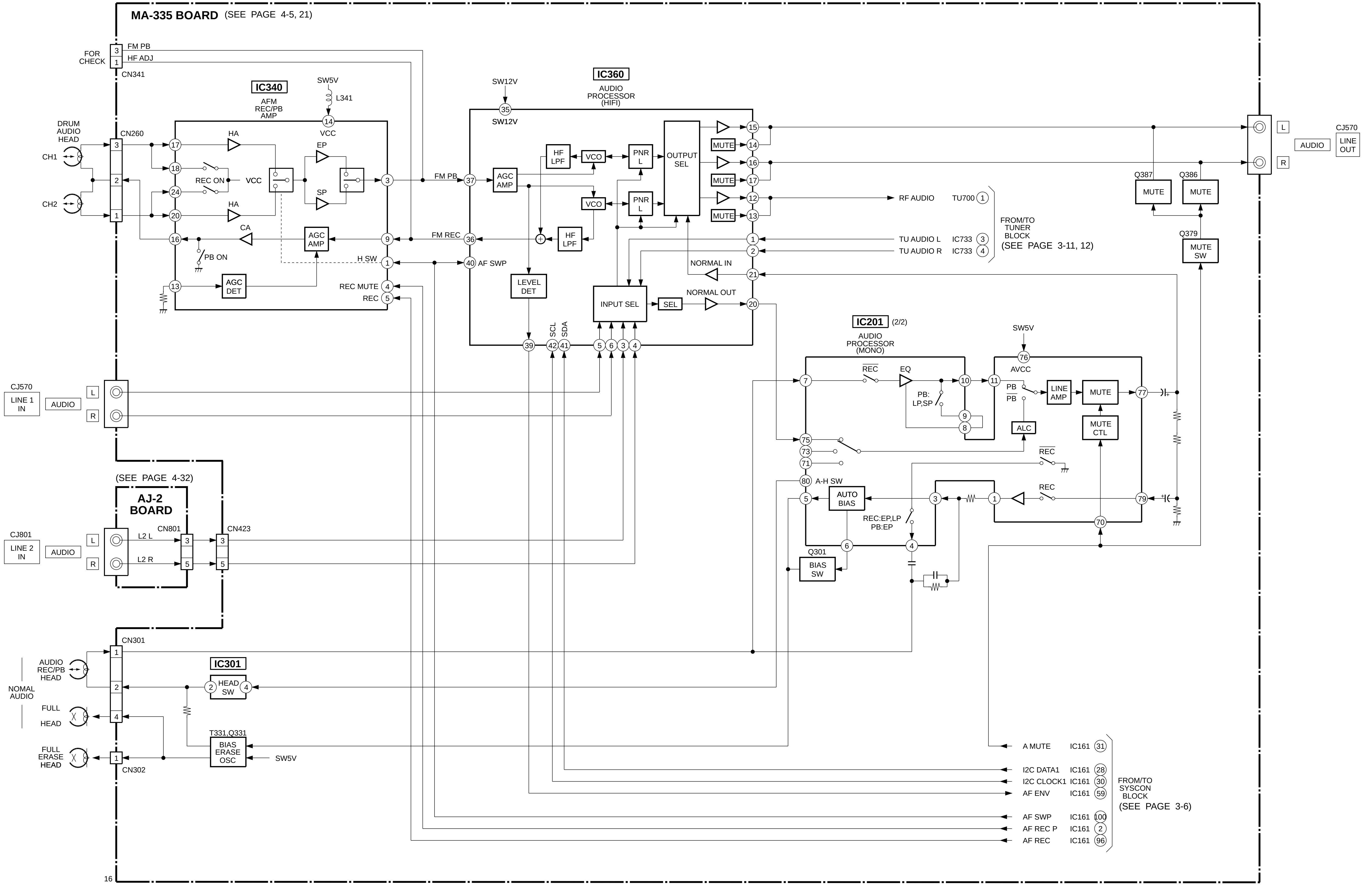
3-2. VIDEO BLOCK DIAGRAM



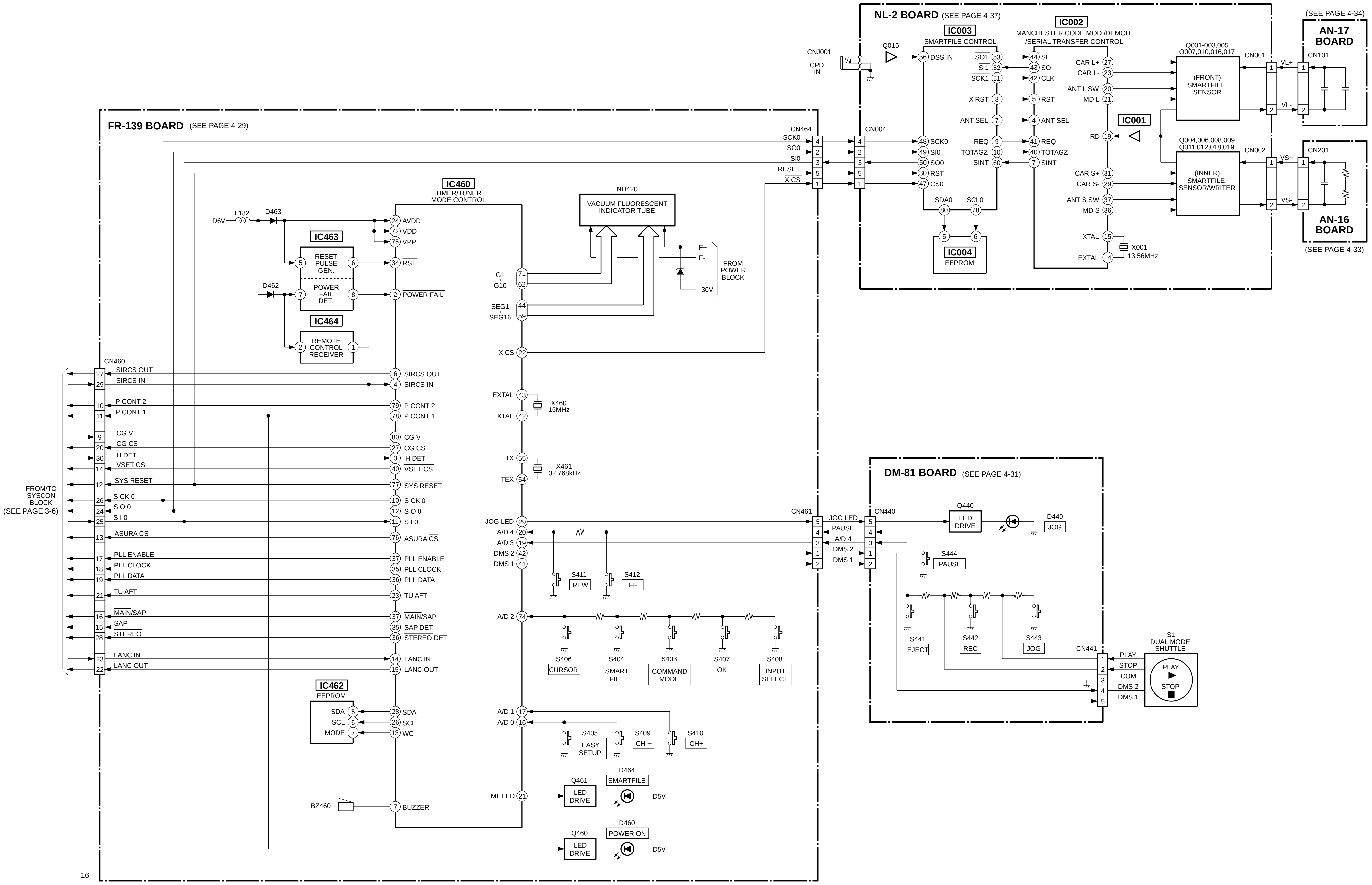
3-3. SERVO/SYSTEM CONTROL BLOCK DIAGRAM



3-4. AUDIO BLOCK DIAGRAM

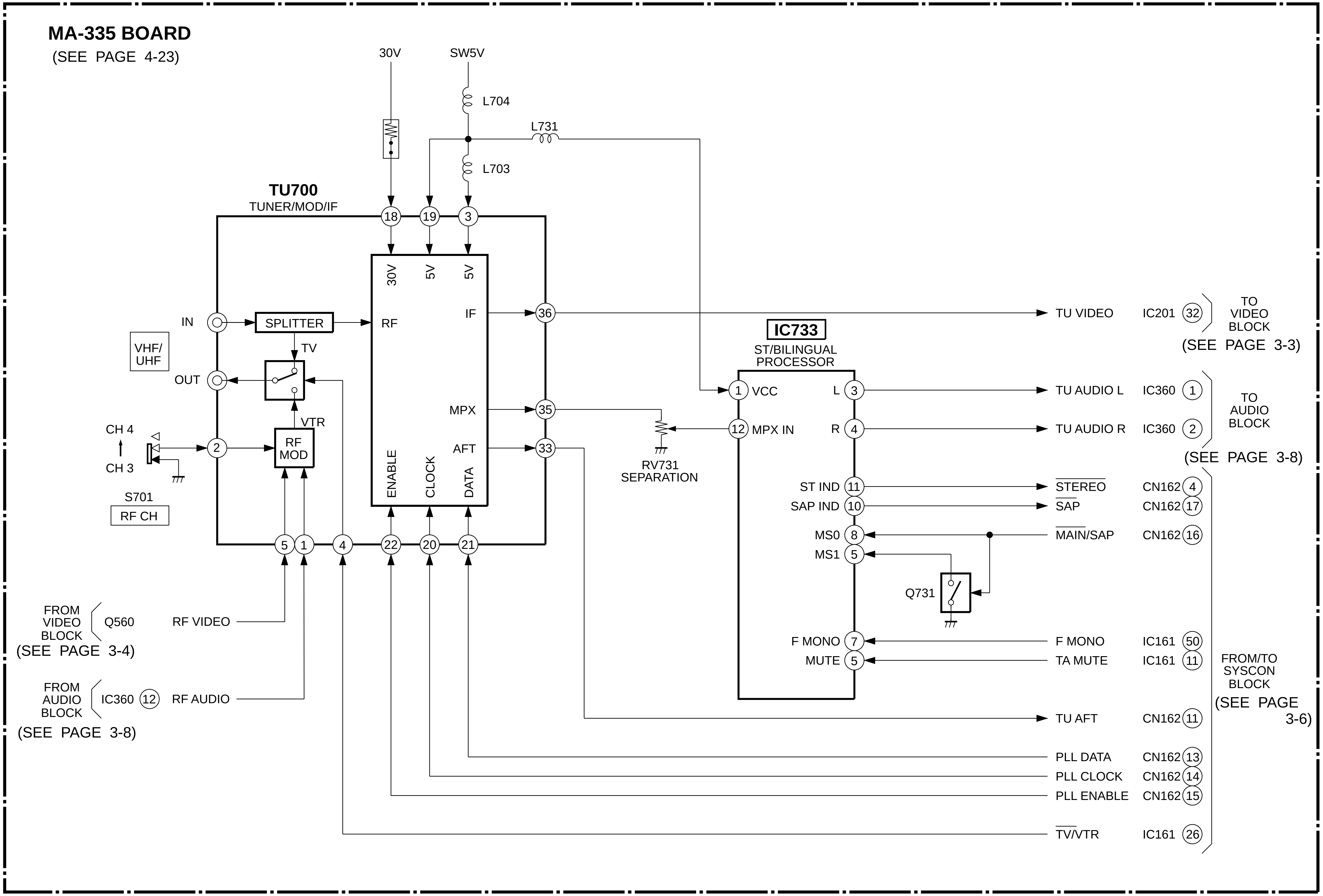


3-5. MODE CONTROL BLOCK DIAGRAM

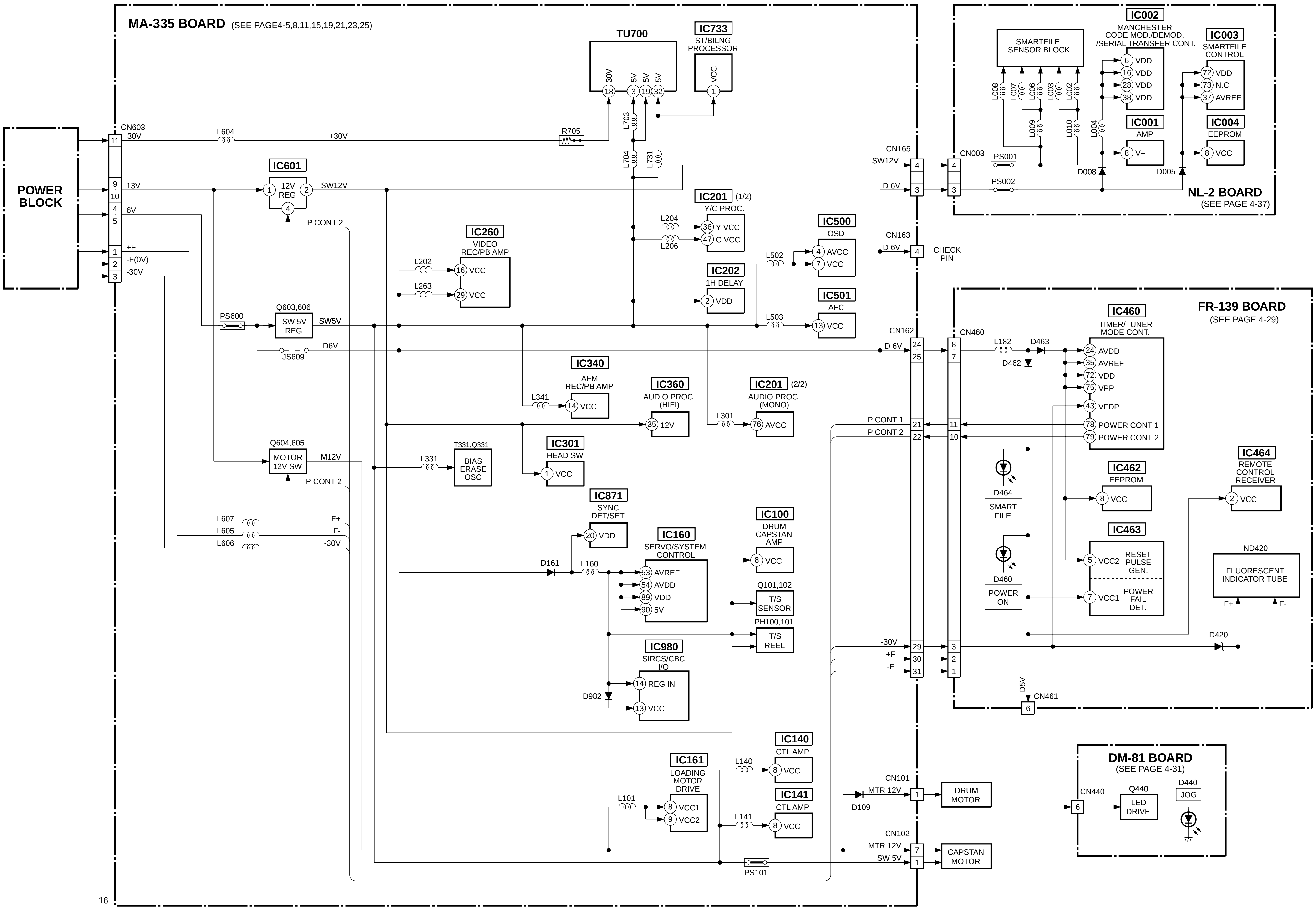


16

3-6. TUNER BLOCK DIAGRAM

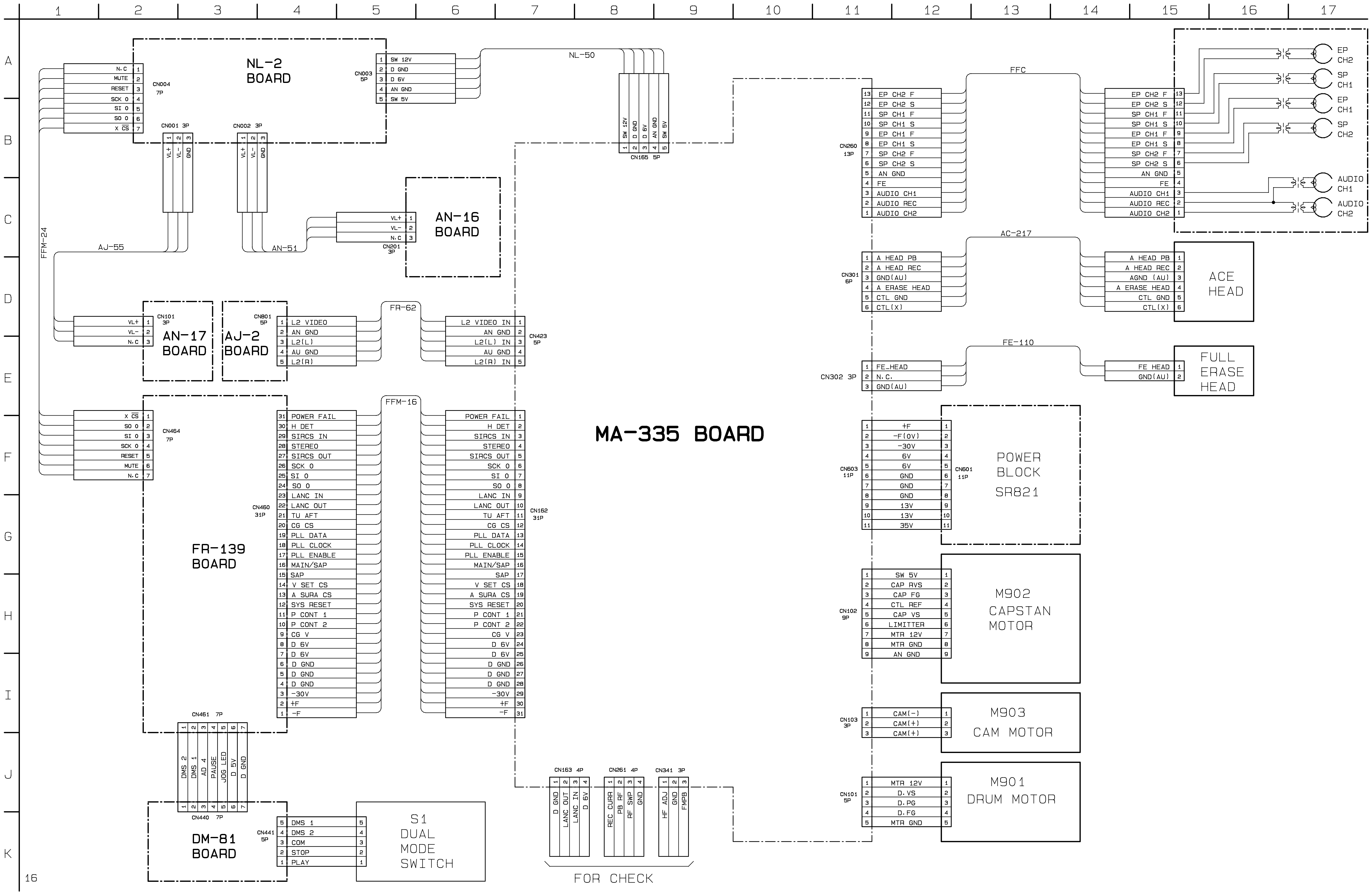


3-7. POWER SUPPLY BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM



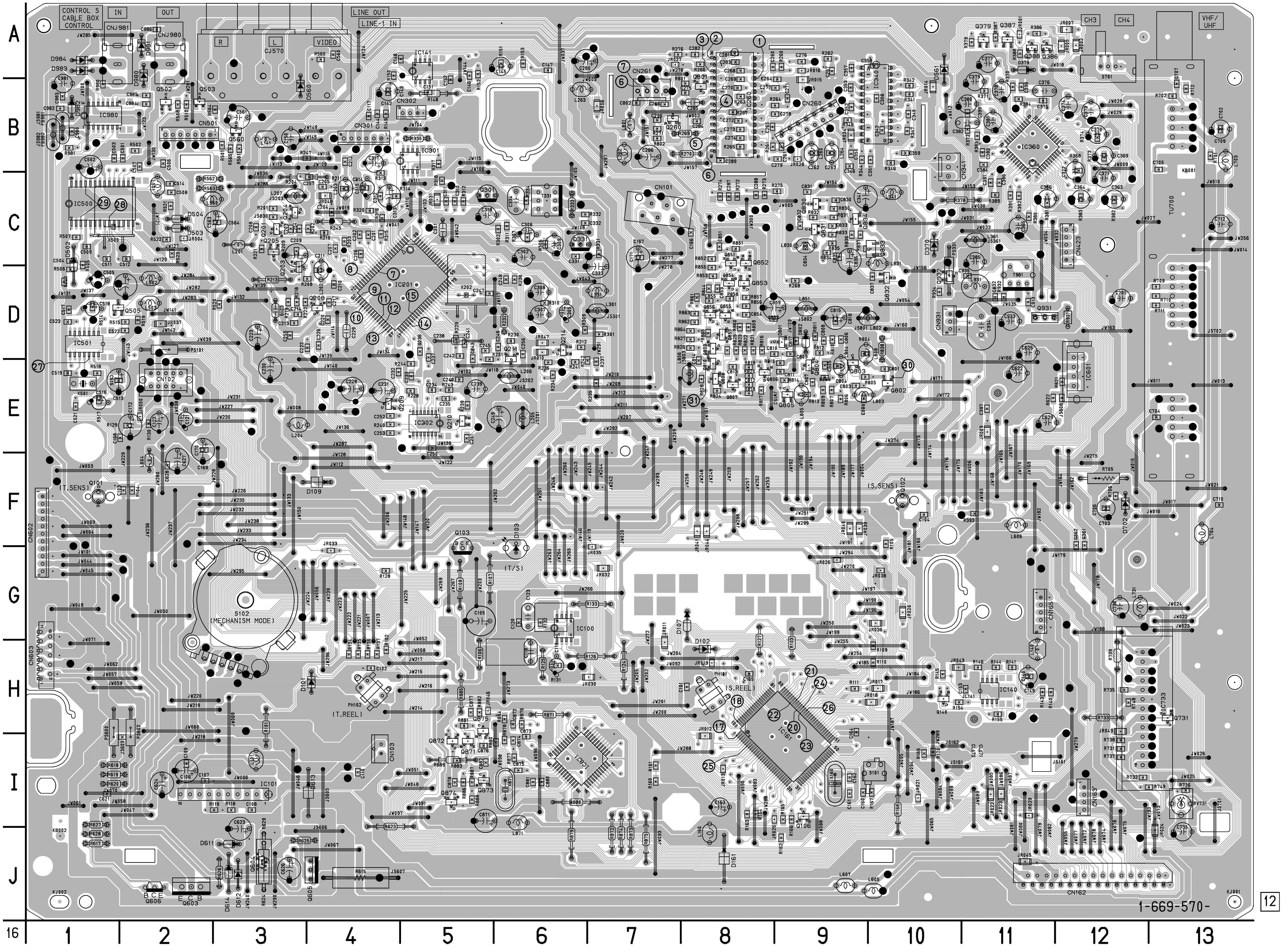
4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-335 (REC/PB AMP, VIDEO, SERVO/SYSTEM CONTROL, AUDIO, TUNER) PRINTED WIRING BOARD

— Ref. No.: MA-335 Board; 1,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.

MA-335 BOARD (CONDUCTOR SIDE)

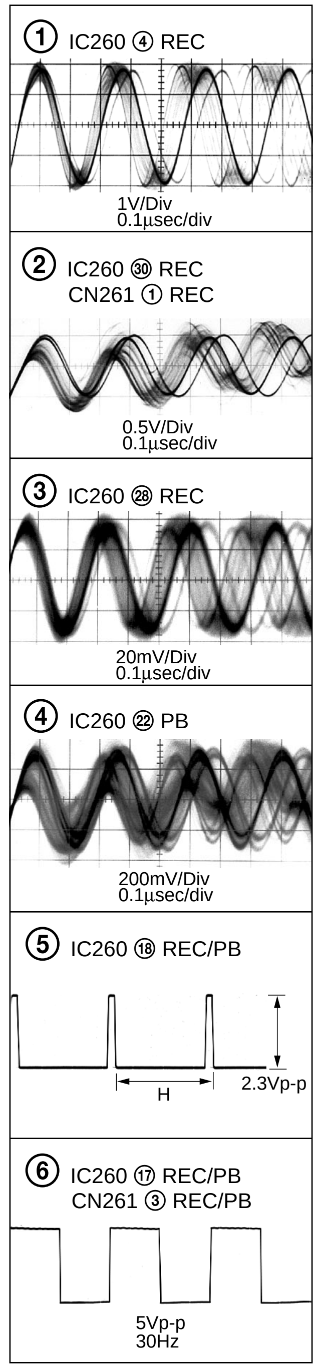


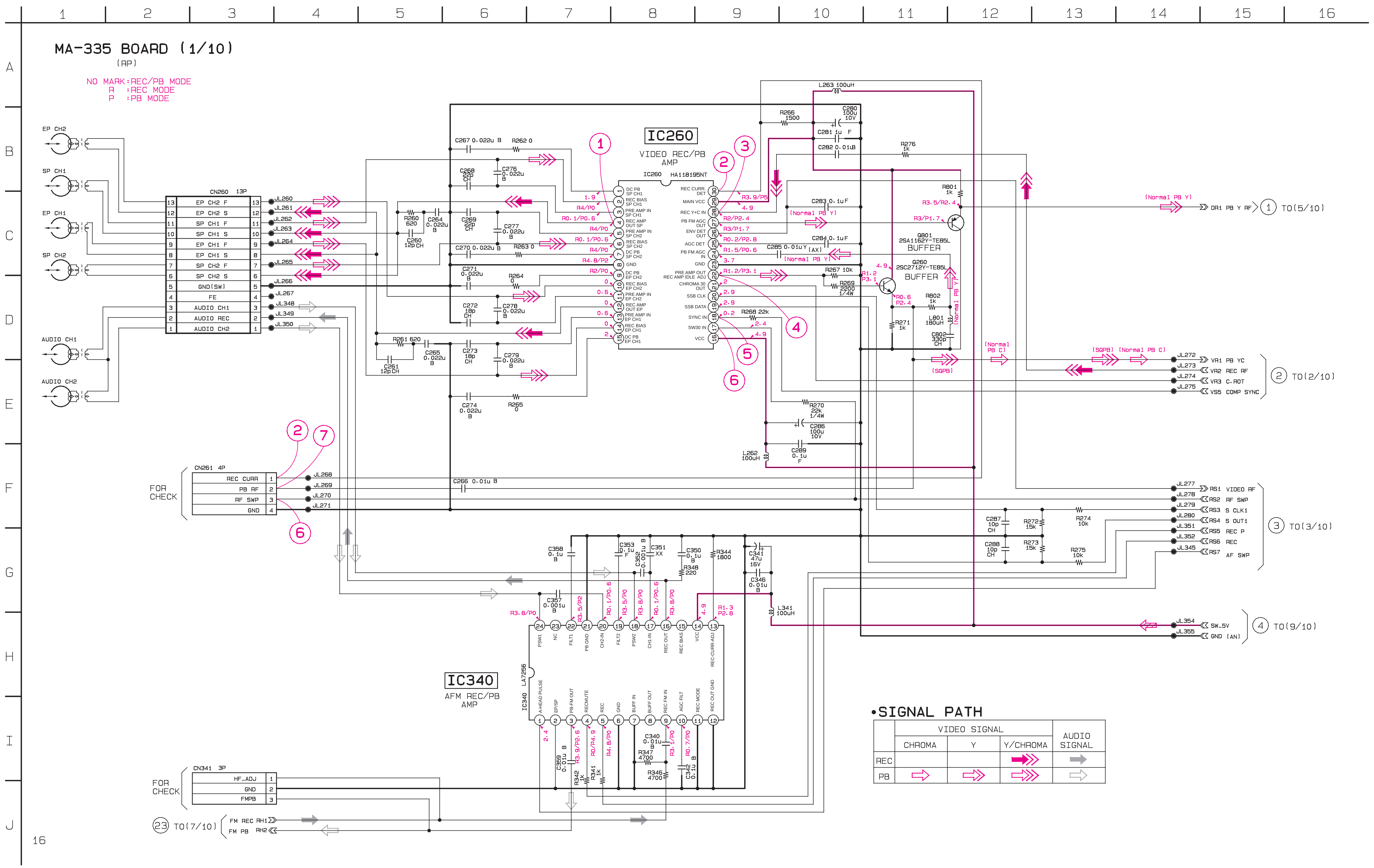
MA-335 (REC/PB AMP) SCHEMATIC DIAGRAM

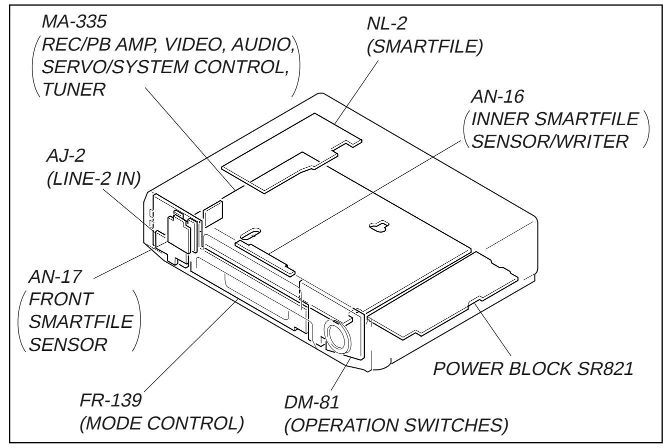
— Ref. No.: MA-335 Board; 1,000 Series —

MA-335 BOARD

CJ570	A-3	D982	B-1	Q301	C-5
		D983	A-1	Q331	C-6
CN101	C-7	D984	A-1	Q379	A-11
CN102	E-2			Q386	A-11
CN103	I-4	IC100	G-6	Q387	A-11
CN162	J-12	IC101	I-3	Q502	B-2
CN163	I-12	IC140	H-11	Q503	B-2
CN165	G-11	IC141	A-5	Q505	D-1
CN260	B-9	IC161	I-9	Q560	B-3
CN261	B-7	IC201	D-5	Q603	J-2
CN301	B-4	IC202	E-5	Q604	J-3
CN302	B-5	IC260	B-8	Q605	J-4
CN341	B-10	IC301	B-5	Q606	J-2
CN423	C-12	IC340	B-10	Q731	H-13
CN603	I-11	IC360	B-11	Q801	B-8
		IC500	C-1	Q802	E-10
CNJ980	A-2	IC501	D-1	Q803	E-9
CNJ981	A-1	IC601	E-12	Q804	E-9
		IC733	H-13	Q805	E-9
D103	F-6	IC871	I-6	Q806	E-8
D107	G-8	IC980	B-1	Q807	E-8
D109	F-4			Q808	E-8
D161	J-8	PH101	H-8	Q809	D-9
D370	C-10	PH102	H-4	Q810	E-8
D379	A-11			Q851	C-8
D502	C-1	Q101	F-1	Q852	C-8
D503	C-2	Q102	F-10	Q853	D-8
D504	C-2	Q103	F-5	Q854	D-8
D560	B-3	Q140	H-10	Q855	D-8
D561	A-10	Q201	C-3	Q856	D-8
D611	J-3	Q204	C-3	Q857	D-8
D612	J-3	Q205	C-3	Q871	I-5
D614	J-3	Q208	D-4	Q872	I-5
D702	F-12	Q209	E-4	Q873	I-5
D801	D-9	Q210	E-5	Q874	I-5
D802	D-9	Q211	D-6	Q875	H-5
D980	A-2	Q214	D-6		
D981	A-2	Q260	B-7		







THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For printed wiring boards.**
- ░░░ : Pattern from the side which enables seeing.

Caution :	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Pattern face side: (Component Side)	parts on the parts face side seen from the parts face are indicated.

- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistor are in ohms, 1/4W unless otherwise noted.
  Chip resistor are 1/10W unless otherwise noted.
  kΩ: 1000Ω, MΩ, : 1000kΩ.
- All capacitors are in µF unless otherwise noted. pF : µµF. 50V or less are not indicated except for electrolytics and tantalums.
- ▭ : panel designation.
- △ : internal component.
- ▬ : B+ Line. *
- ▬ ▬ ▬ : B– Line. *
- ⇨ : IN/OUT direction of (+,–) B LINE. *
- Circled numbers refer to waveforms. *
- Readings are taken with a color-bar signal input.
- Voltage are dc between ground and measurement points.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

When indicating parts by reference number, please include the board name.

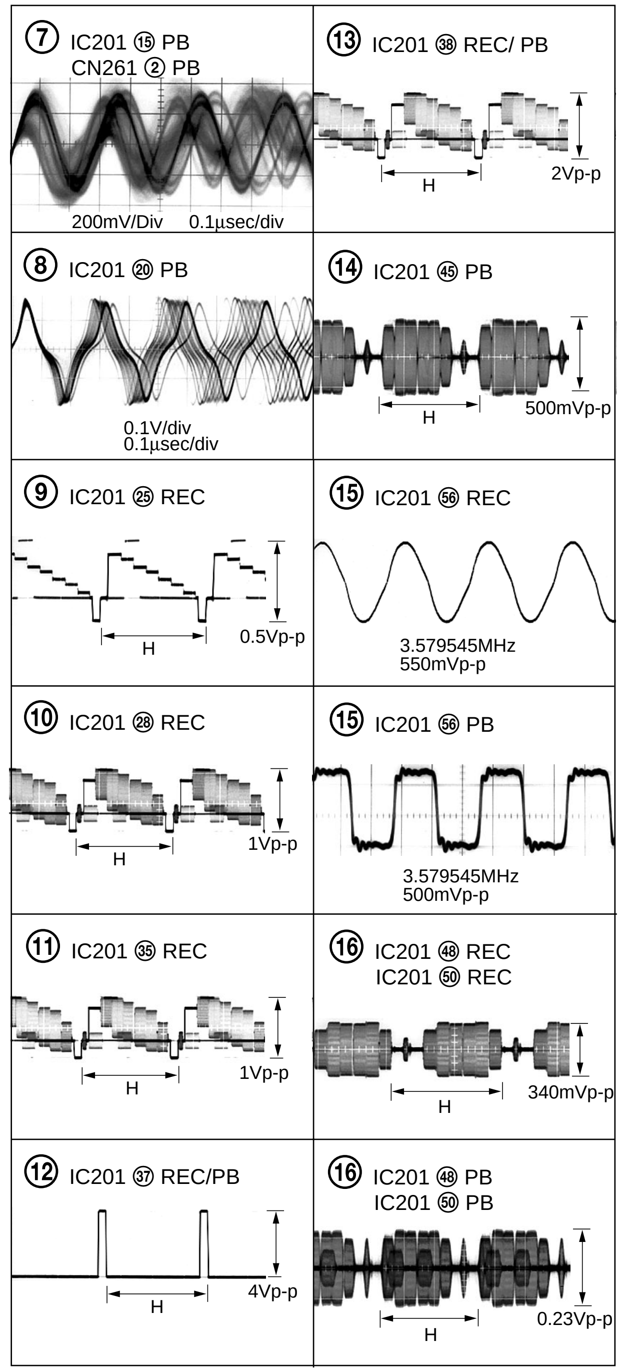
- * : indicated by the color red.

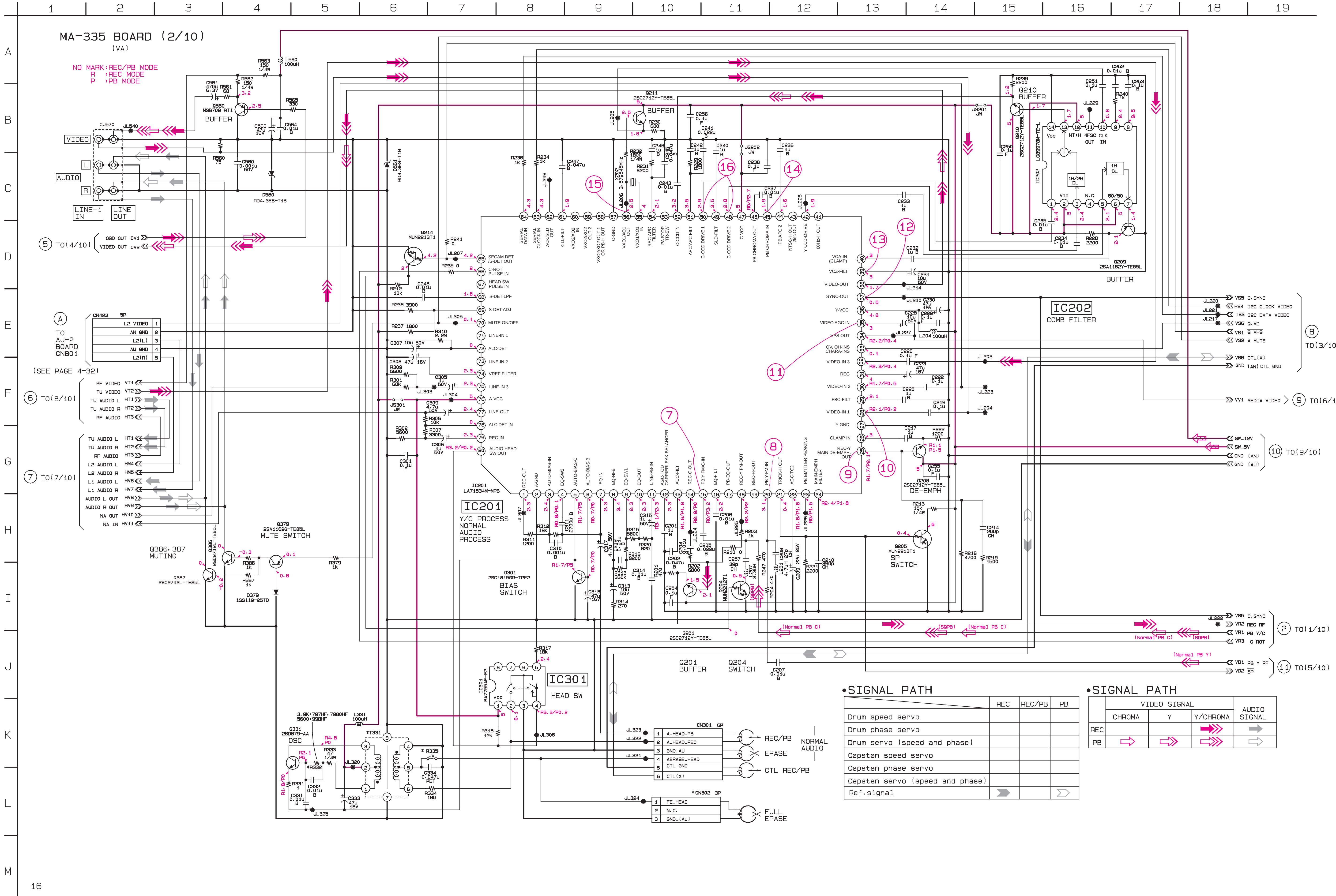
MA-335 (VIDEO, NORMAL AUDIO) SCHEMATIC DIAGRAM

— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.

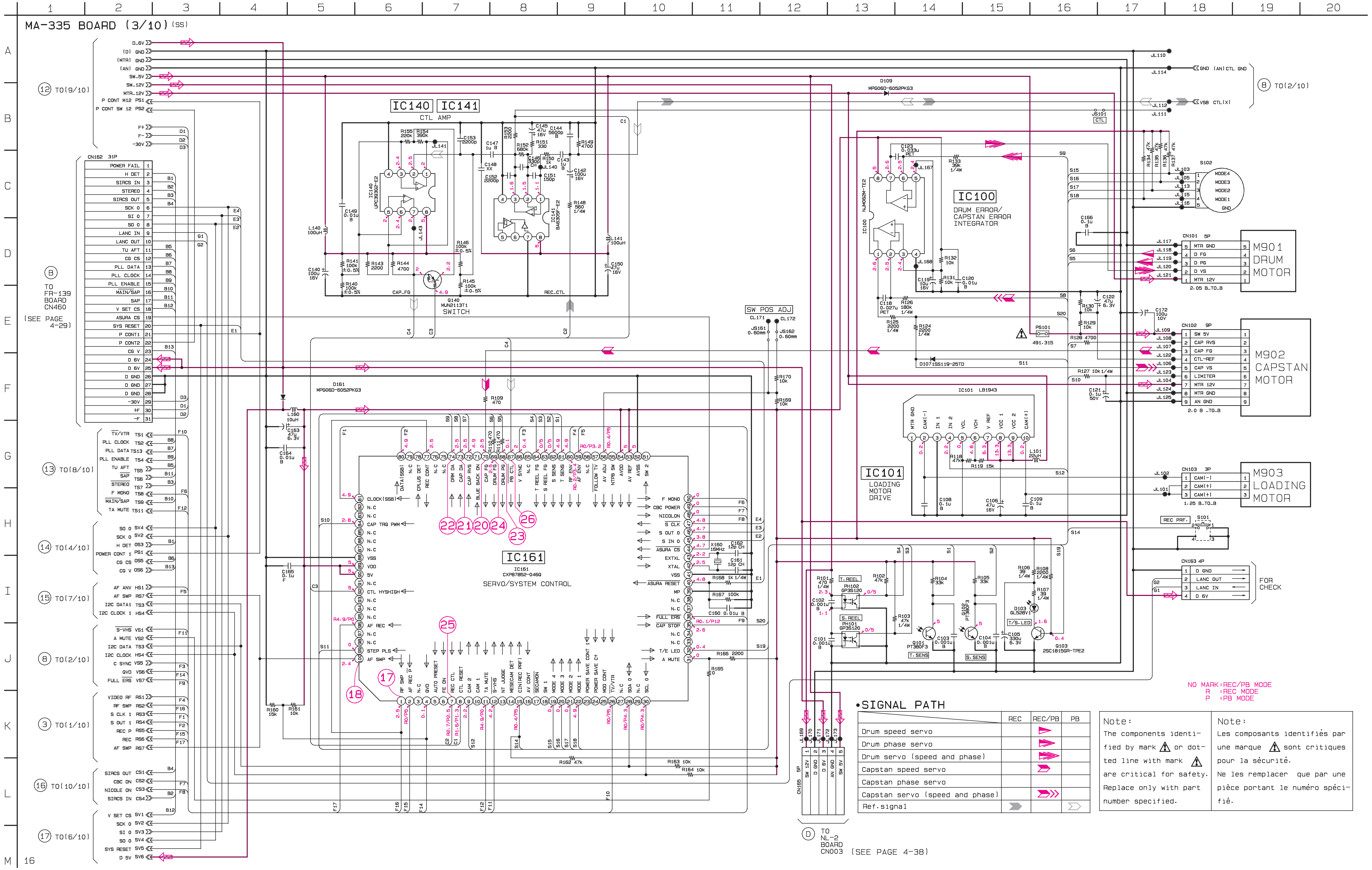
MA-335 BOARD





MA-335 (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM • See page 4-3 for MA-335 BOARD printed wiring board.

— Ref. No.: MA-335 Board; 1,000 Series —



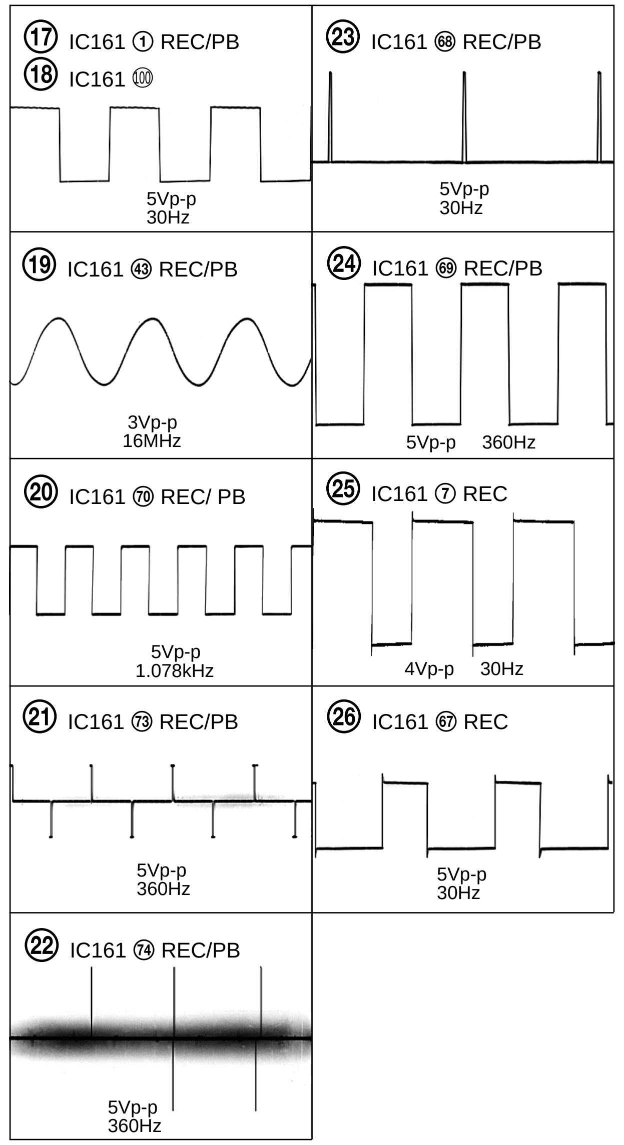
• SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		⯈⯈	
Drum servo (speed and phase)		⯈⯈⯈	
Capstan speed servo		➤	
Capstan phase servo			
Capstan servo (speed and phase)		➤»»	
Ref.signal	➤		▷

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

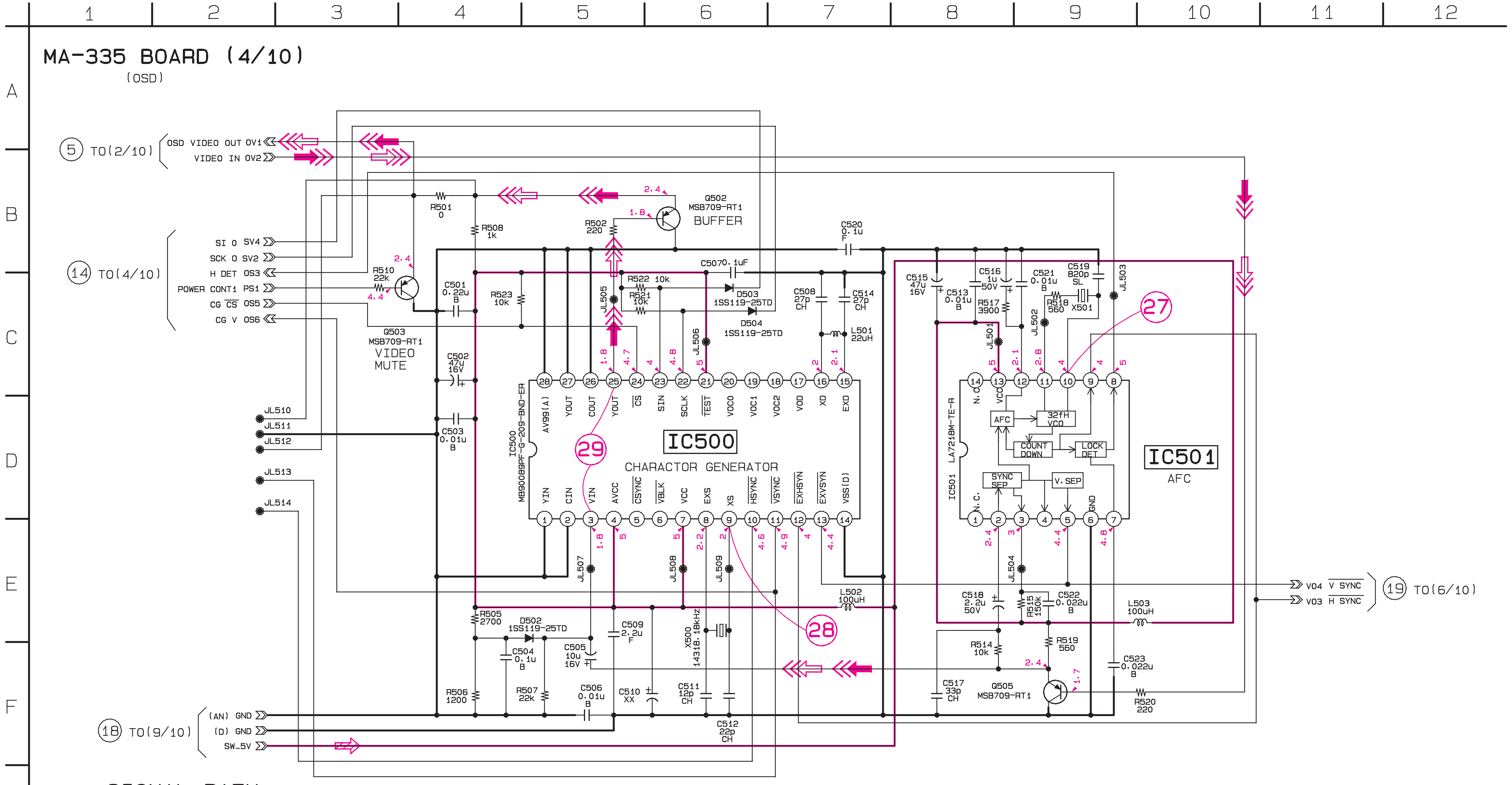
Note:
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

MA-335 BOARD



MA-335 (ON SCREEN DISPLAY) SCHEMATIC DIAGRAM
— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.



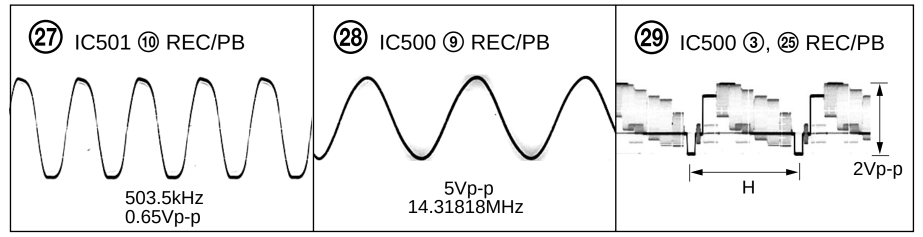
•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			➡	
PB			⇨	

NO MARK:REC/PB MODE

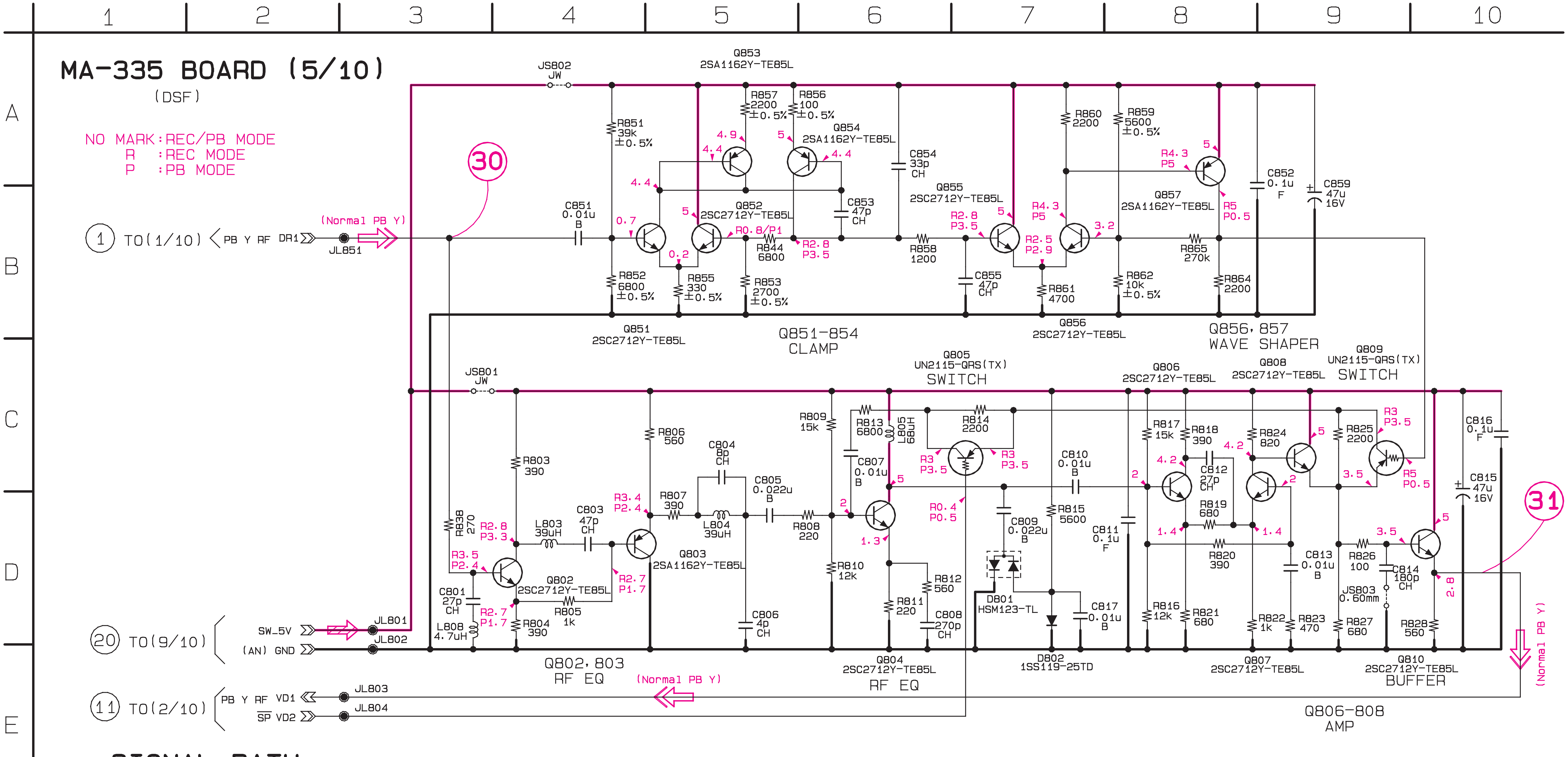
16

MA-335 BOARD



MA-335 (DSF) SCHEMATIC DIAGRAM
— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.

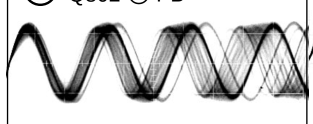


•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				
PB		⇨		

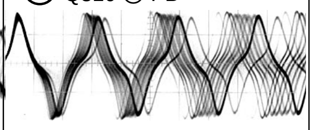
MA-335 BOARD

30 Q802 Ⓑ PB



0.2V/div
0.1µsec/div

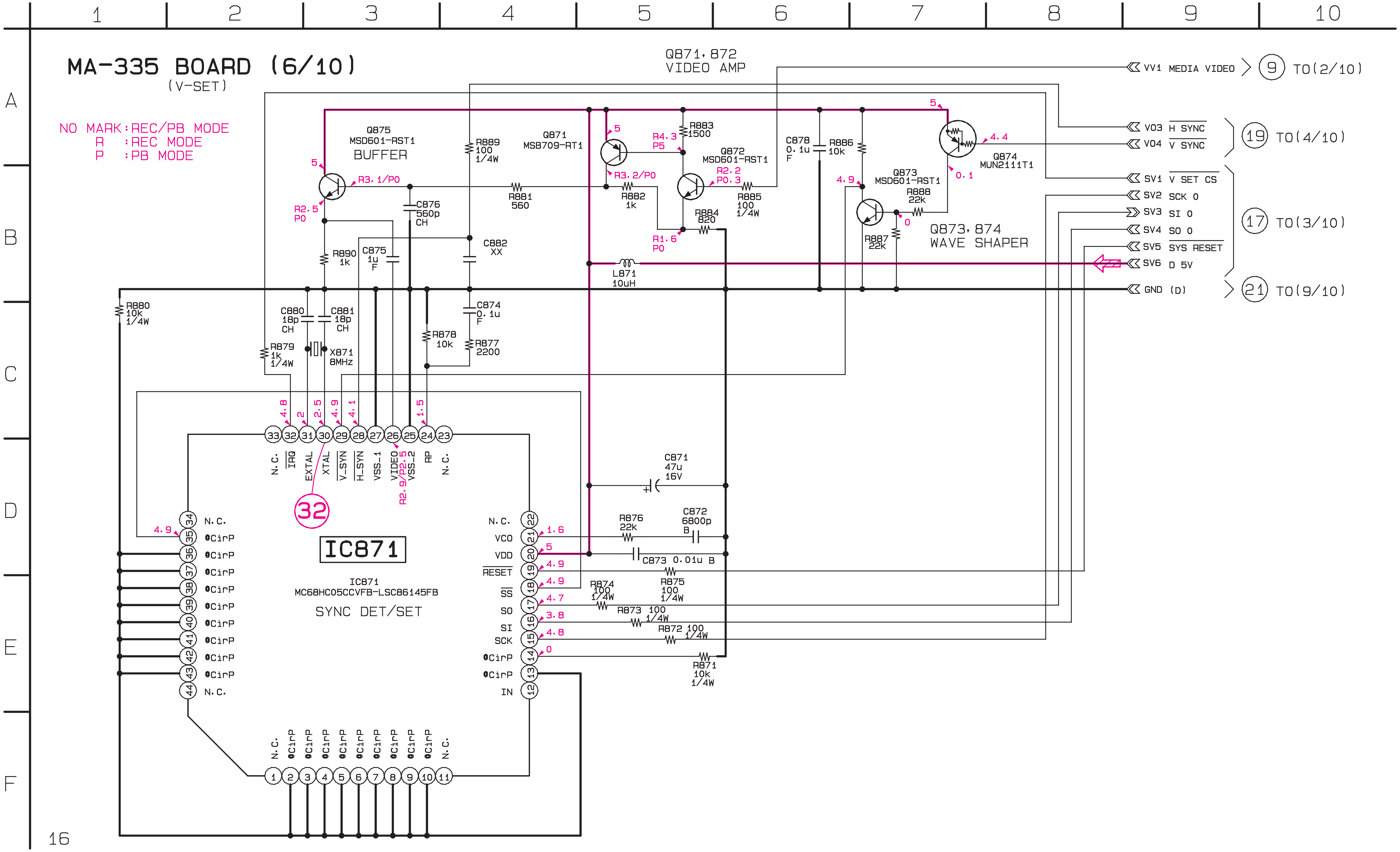
31 Q810 Ⓔ PB



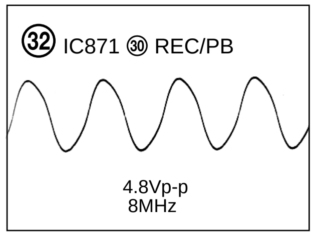
0.1V/div
0.1µsec/div

MA-335 (V-SET) SCHEMATIC DIAGRAM
— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.

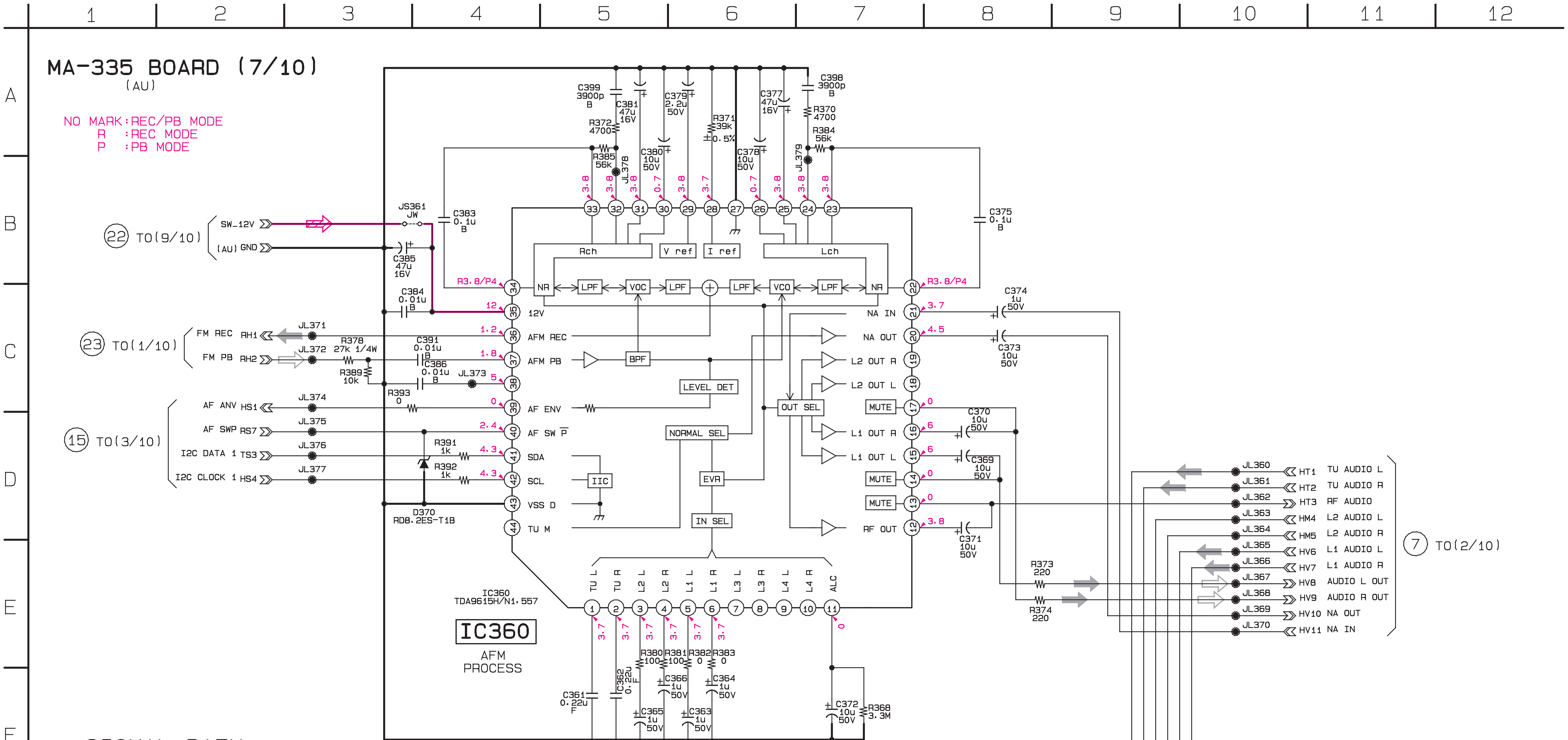


MA-335 BOARD



MA-335 (AFM AUDIO) SCHEMATIC DIAGRAM
— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.

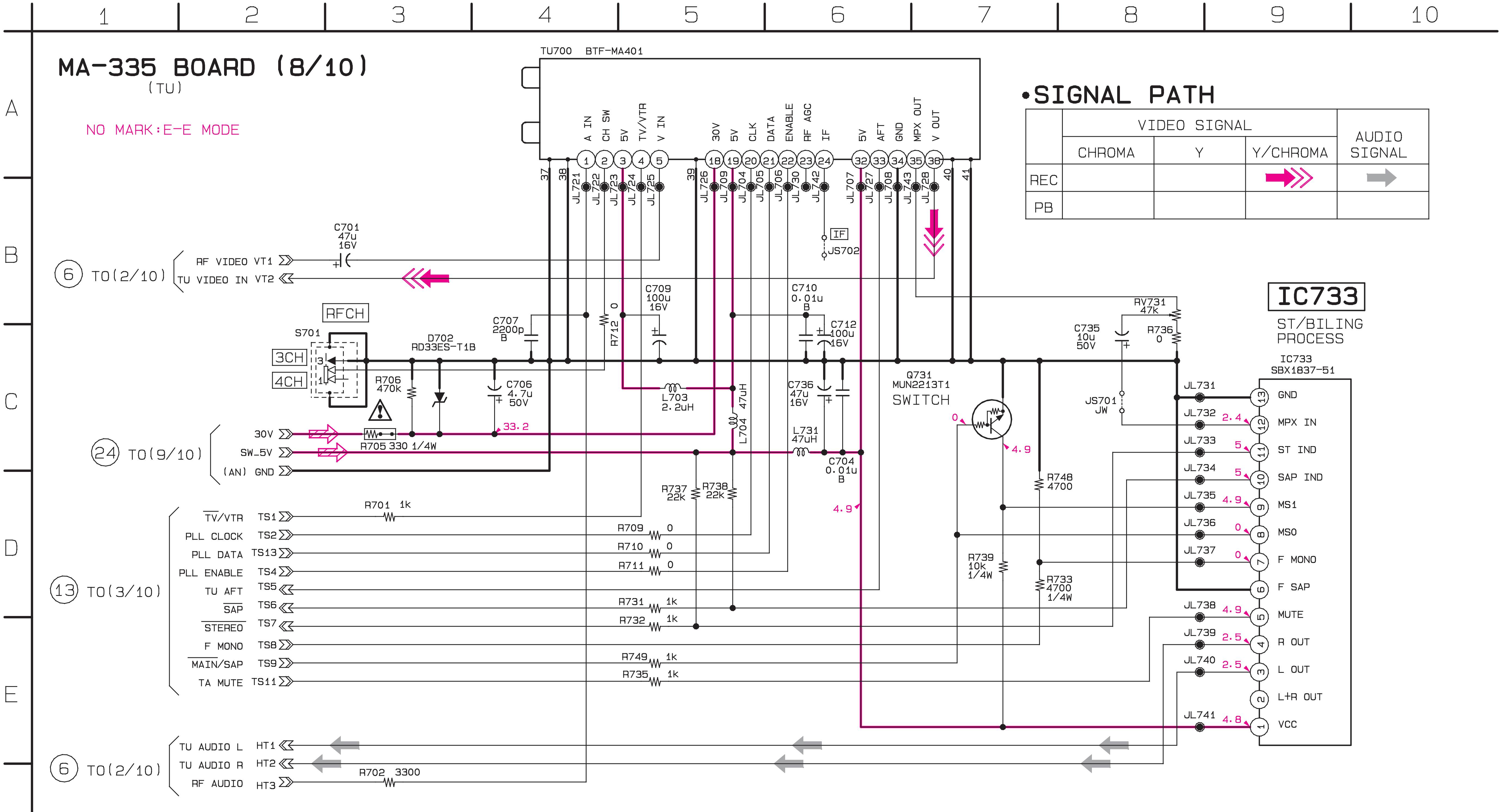


•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC				➡
PB				⇨

MA-335 (TUNER) SCHEMATIC DIAGRAM — Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.



<table>
<tr><td>

Note:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.

Replace only with part number specified.

</td><td>

Note:

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.

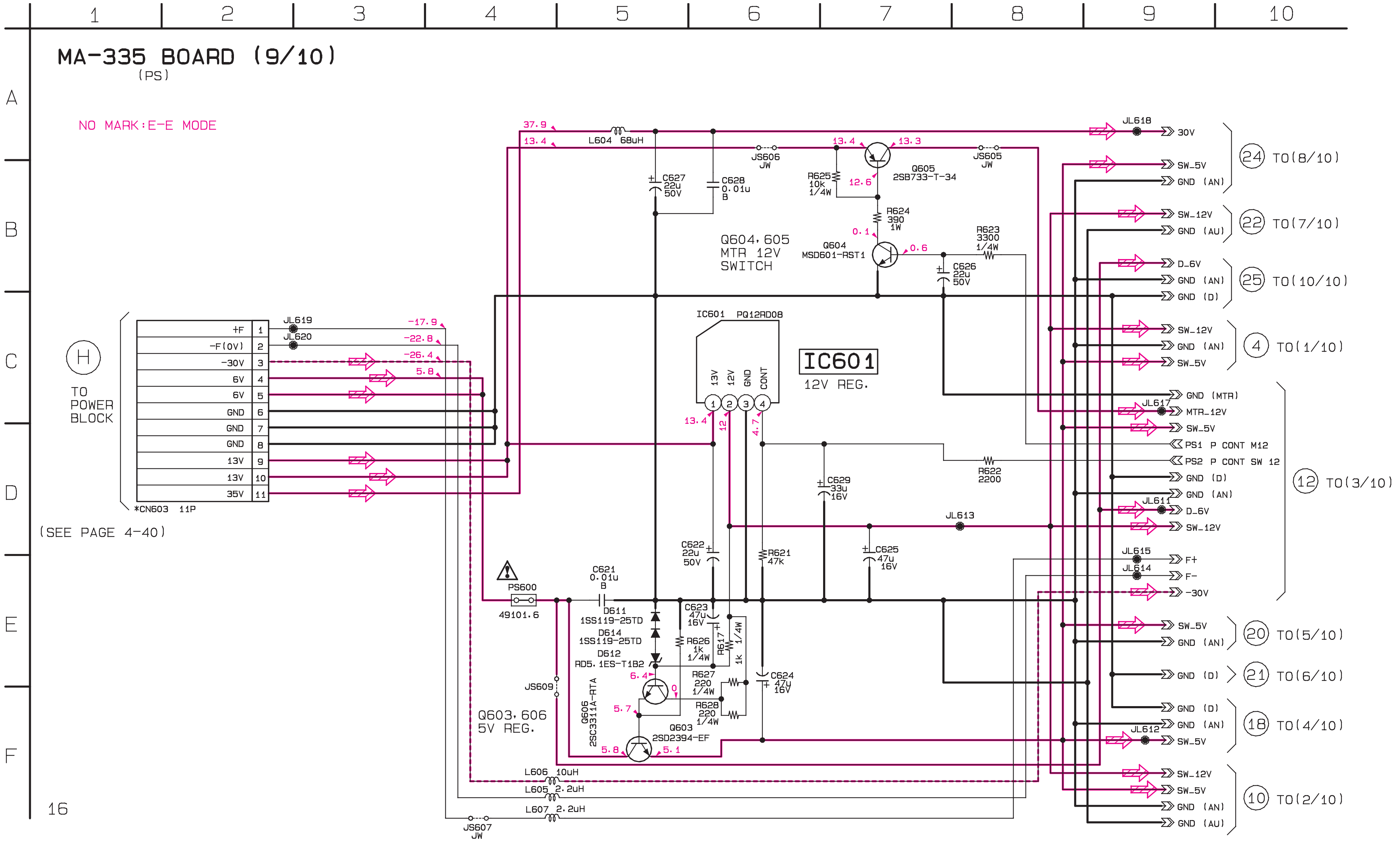
Ne les remplacer que par une pièce portant le numéro spécifié.

</td></tr>
</table>

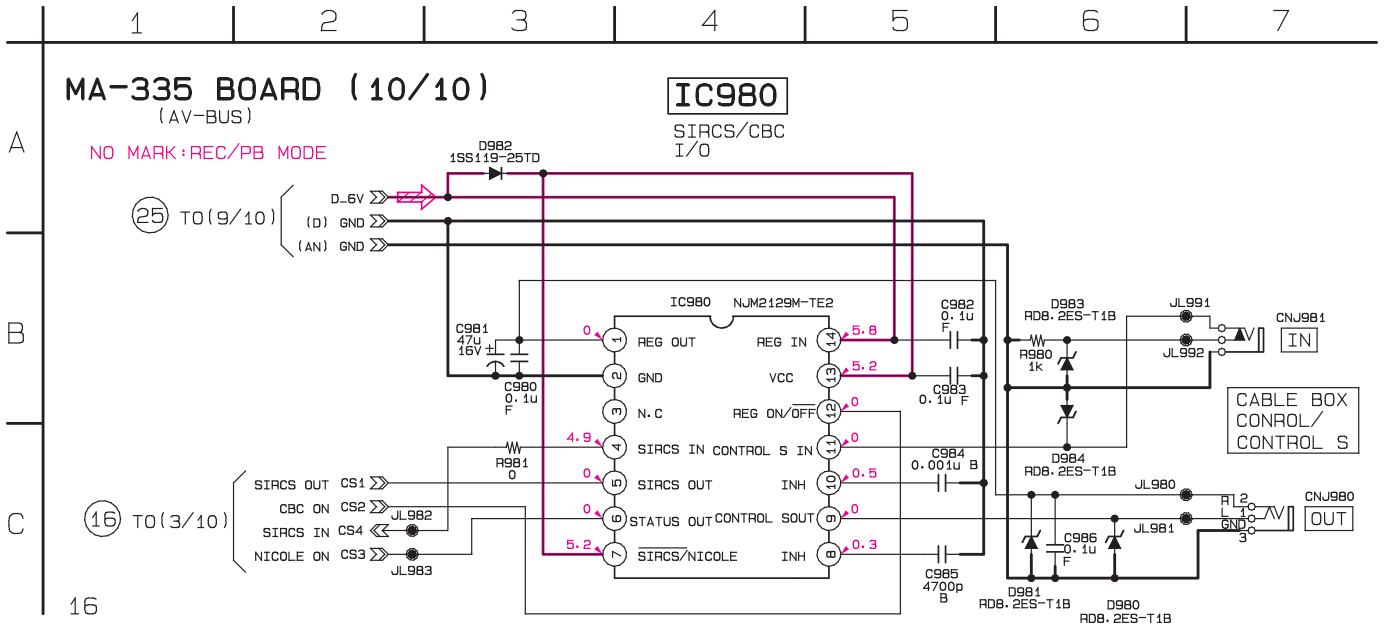
16

MA-335 (POWER SUPPLY, AV-BUS) SCHEMATIC DIAGRAM
— Ref. No.: MA-335 Board; 1,000 Series —

• See page 4-3 for MA-335 BOARD printed wiring board.

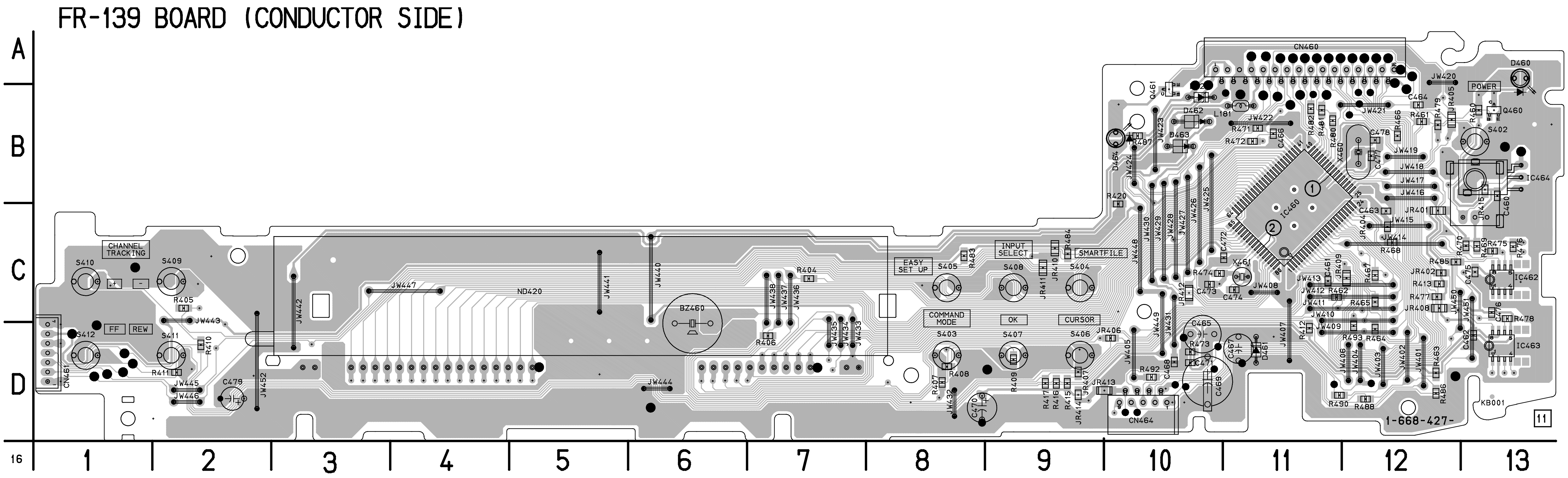


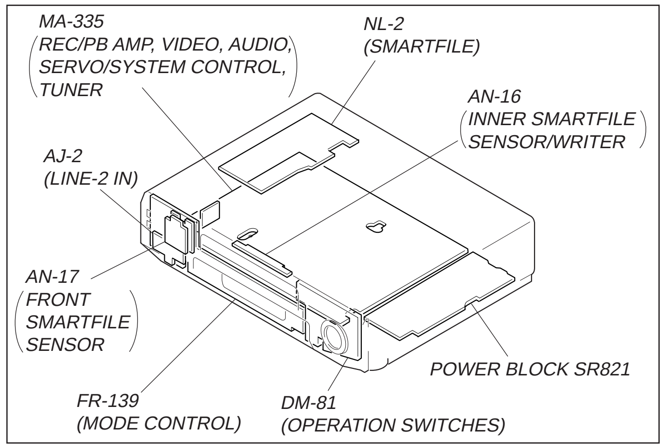
Note:	Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



FR-139 (MODE CONTROL) PRINTED WIRING BOARD
— Ref. No.: FR-139 Board; 2,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.

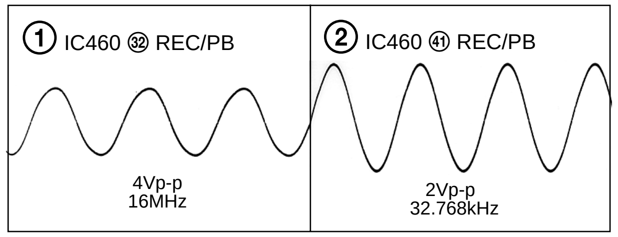




FR-139 BOARD

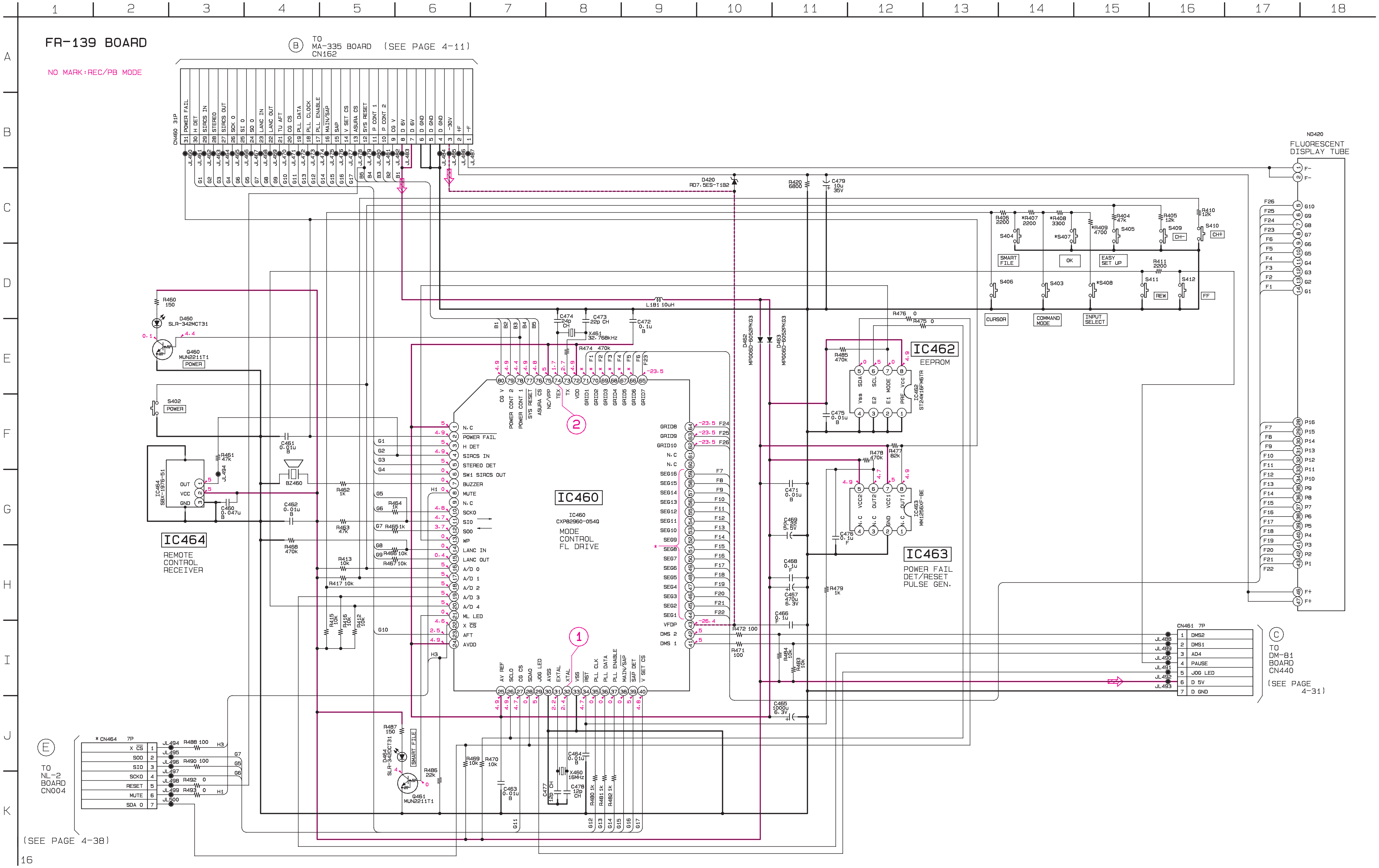
CN460	A-11
CN461	D-1
CN464	D-10
D420	B-10
D460	A-13
D462	B-10
D463	B-10
D464	B-10
IC460	B-11
IC462	C-13
IC463	D-13
IC464	B-13
Q460	B-13
Q461	A-10

FR-139 BOARD



FR-139 (MODE CONTROL) SCHEMATIC DIAGRAM

— Ref. No.: FR-139 Board; 2,000 Series —



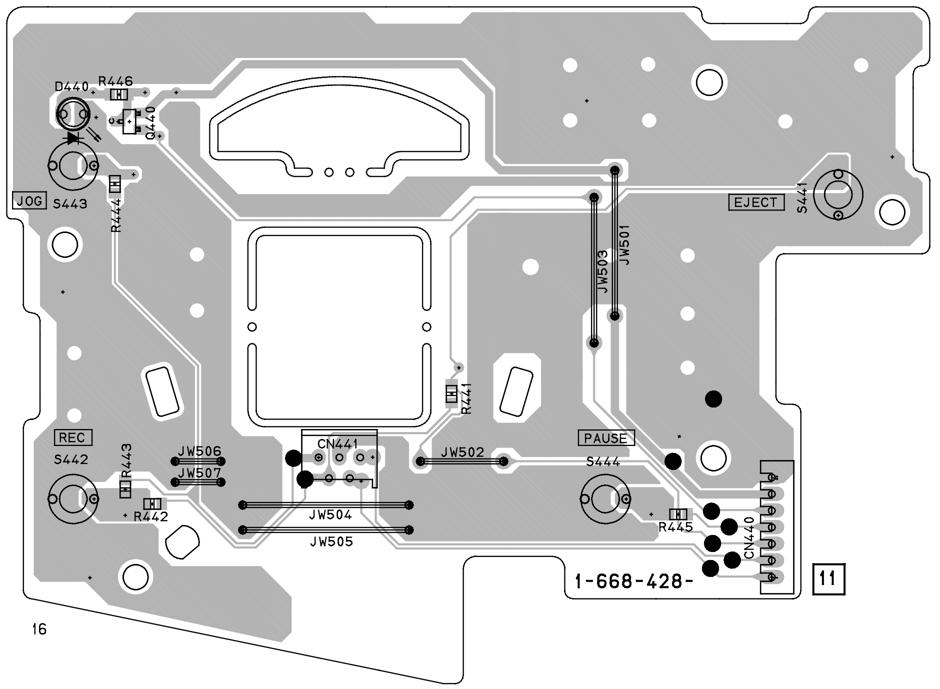
MODE CONTROL
FR-139

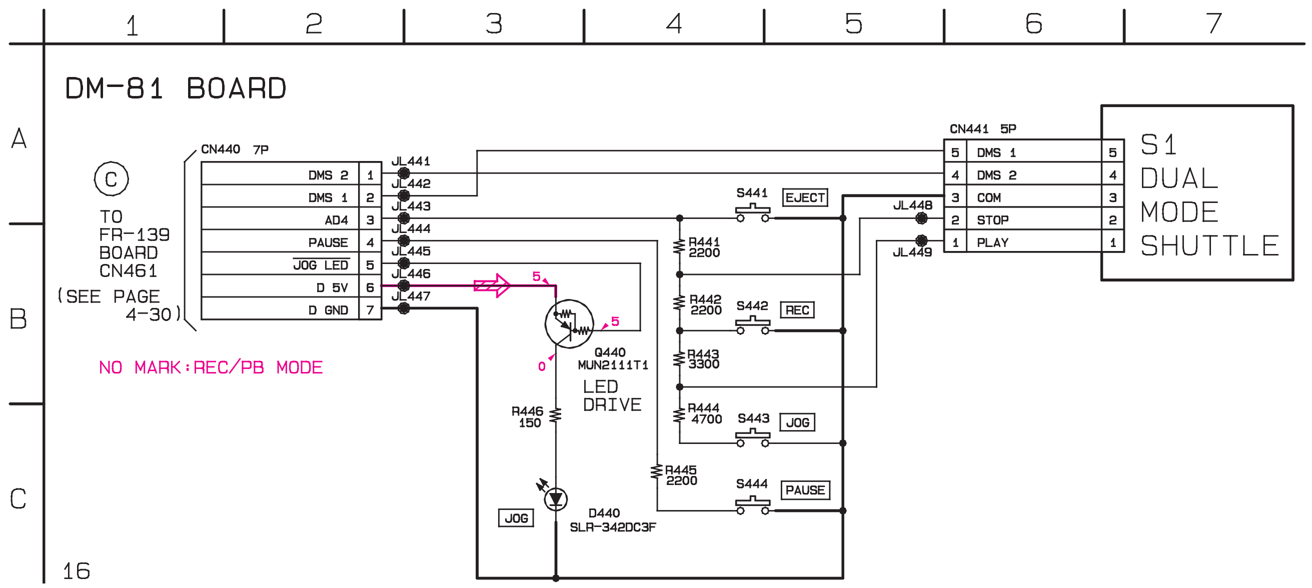
There are few cases that the part printed on this diagram isn't mounted in this model.

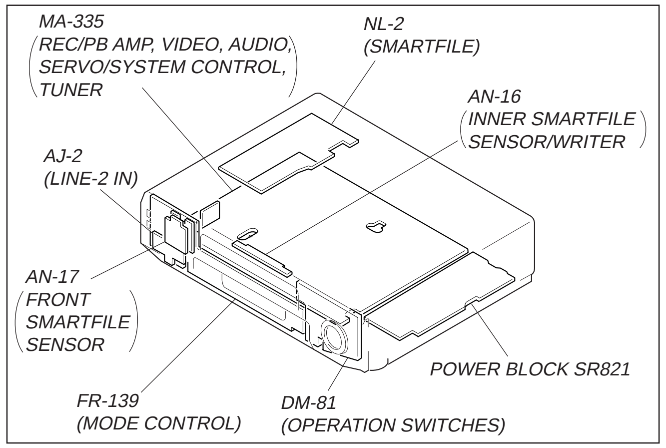
DM-81 (OPERATION SWITCHES) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

— Ref. No.: DM-81 Board; 2,000 Series —

DM-81 BOARD (CONDUCTOR SIDE)





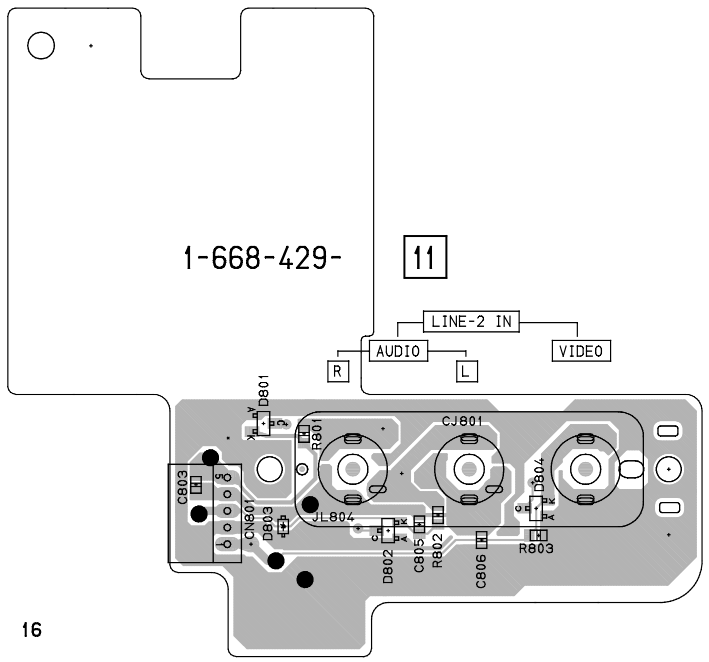


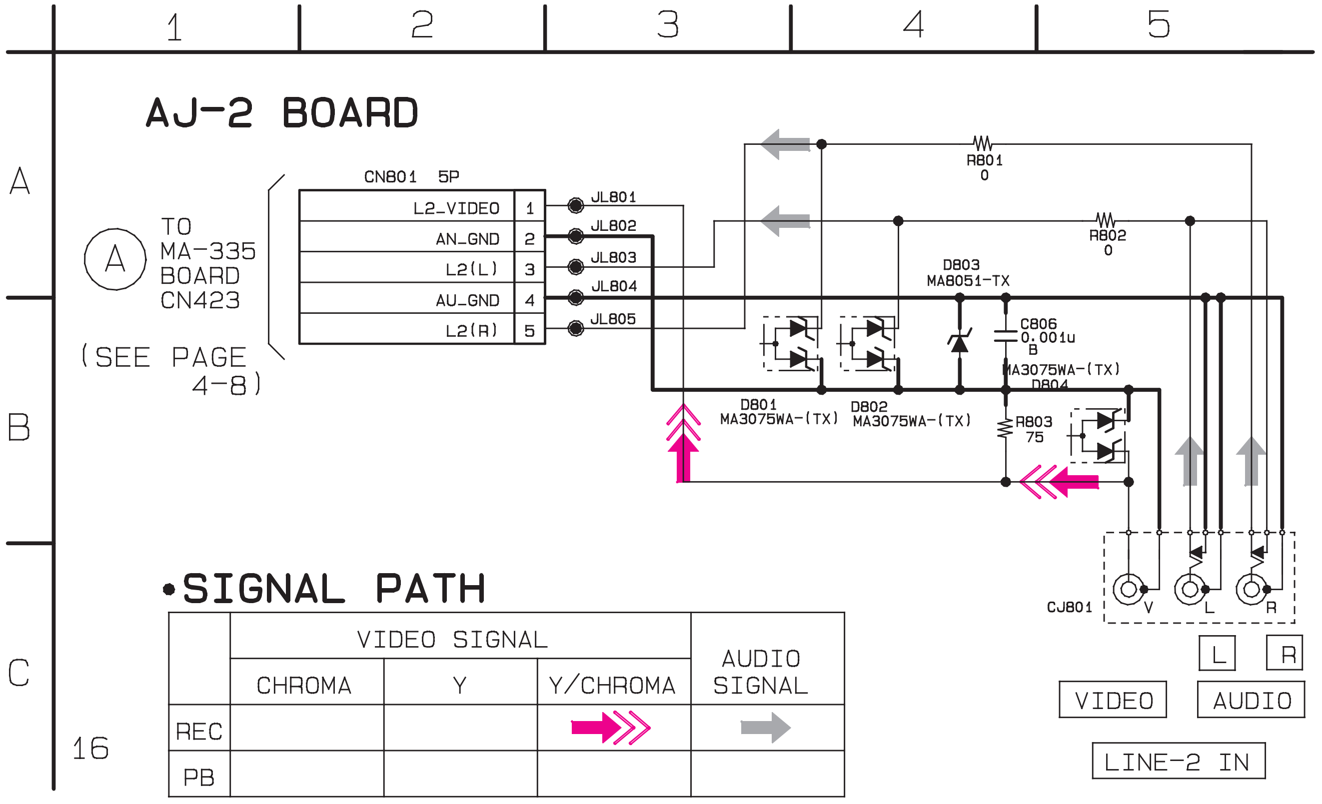
There are few cases that the part printed on this diagram isn't mounted in this model.

AJ-2 (LINE-2 IN) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

— Ref. No.: AJ-2 Board; 3,000 Series —

AJ-2 BOARD (CONDUCTOR SIDE)

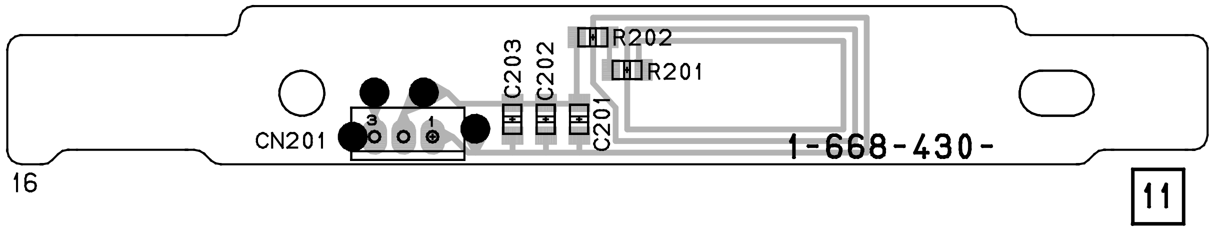




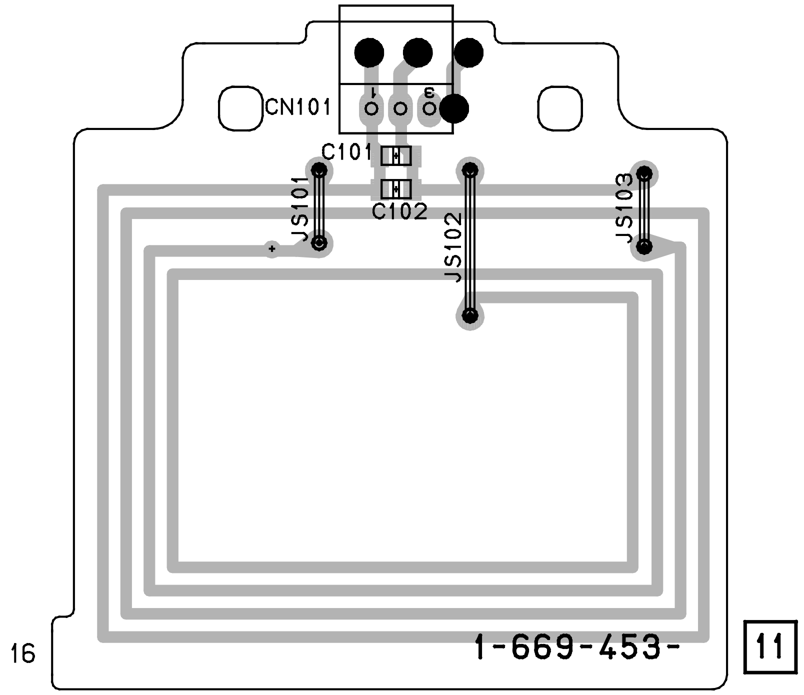
AN-16 (INNER SMARTFILE SENSOR/WRITER), AN-17 (FRONT SMARTFILE SENSOR) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS
— Ref. No.: AN-16, AN-17 Board; 3,000 Series —

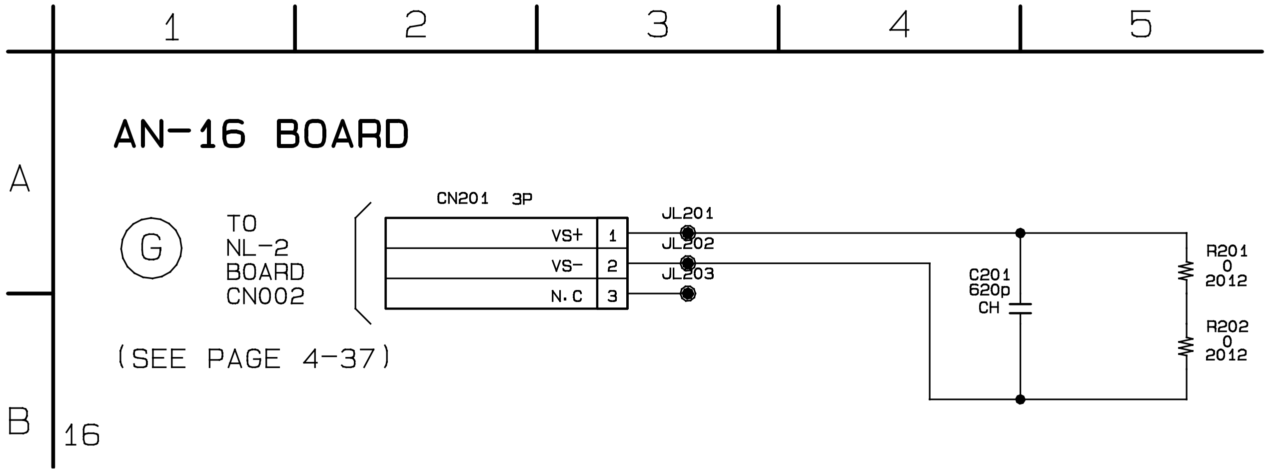
There are few cases that the part printed on this diagram isn't mounted in this model.

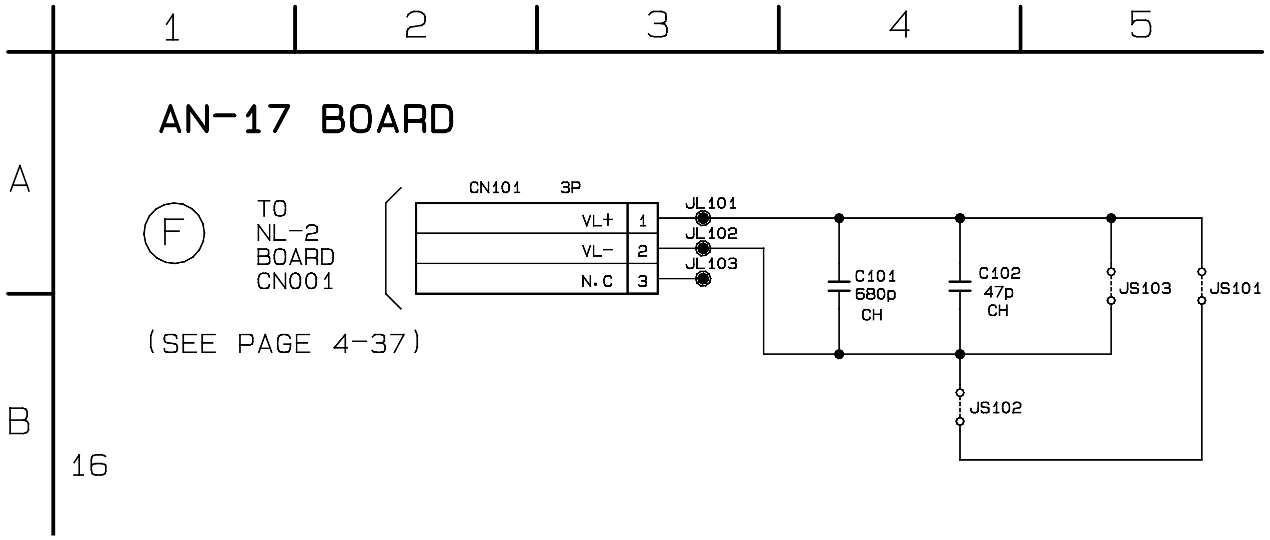
AN-16 BOARD (CONDUCTOR SIDE)

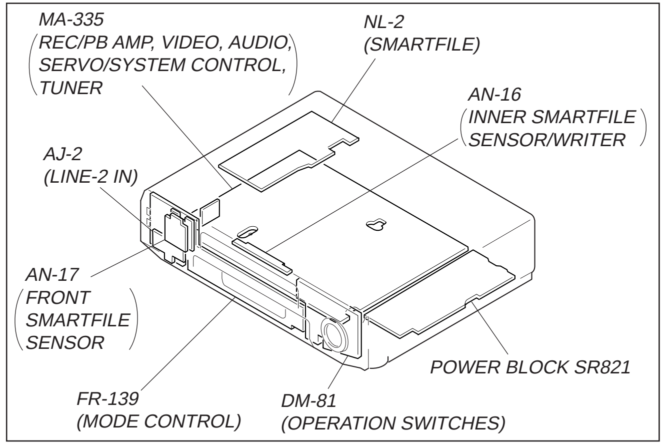


AN-17 BOARD (CONDUCTOR SIDE)









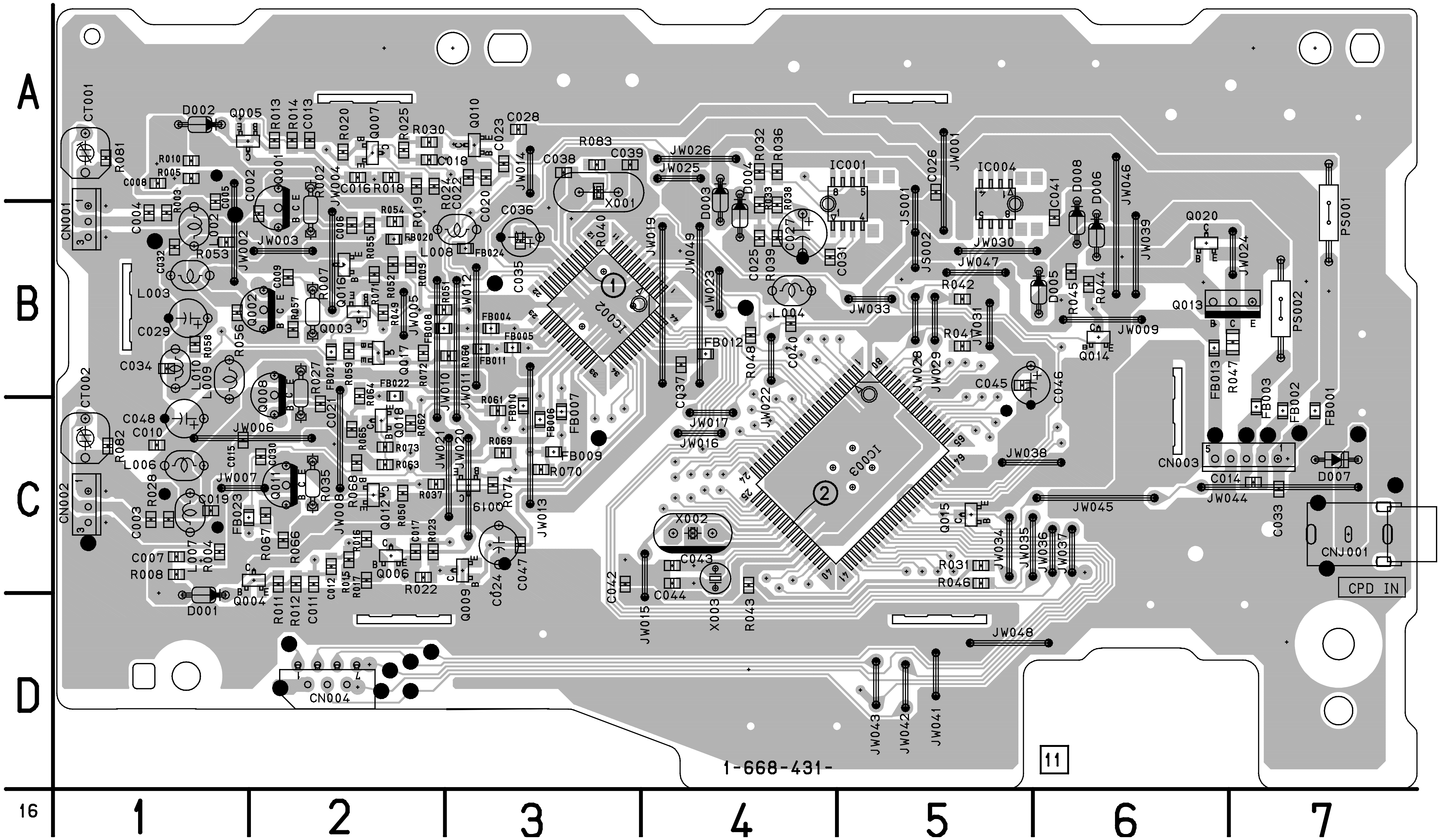
NL-2 (SMARTFILE) PRINTED WIRING BOARD
— Ref. No.: NL-2 Board; 3,000 Series —

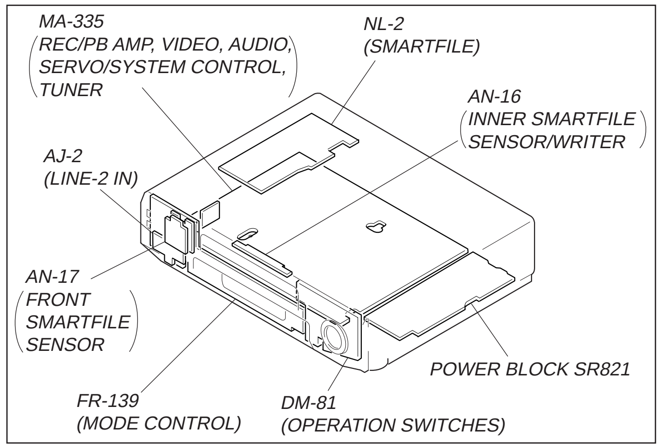
There are few cases that the part printed on this diagram isn't mounted in this model.

NL-2 BOARD (CONDUCTOR SIDE)

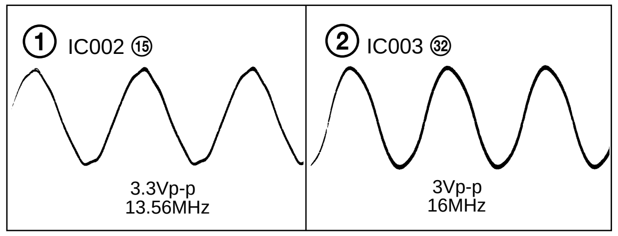
NL-2 BOARD

CN001	B-1
CN002	C-1
CN003	C-7
CN004	D-2
CNJ001	C-7
D001	D-1
D002	A-1
D003	B-4
D004	B-4
D005	B-5
D007	C-7
D008	B-6
IC001	B-5
IC002	B-3
IC003	C-5
IC004	A-5
Q001	B-2
Q002	B-2
Q003	B-2
Q004	C-1
Q005	A-1
Q006	C-2
Q007	A-2
Q008	C-2
Q009	C-3
Q010	A-3
Q011	C-2
Q012	C-2
Q015	C-5
Q016	B-2
Q017	B-2
Q018	C-2
Q019	C-3



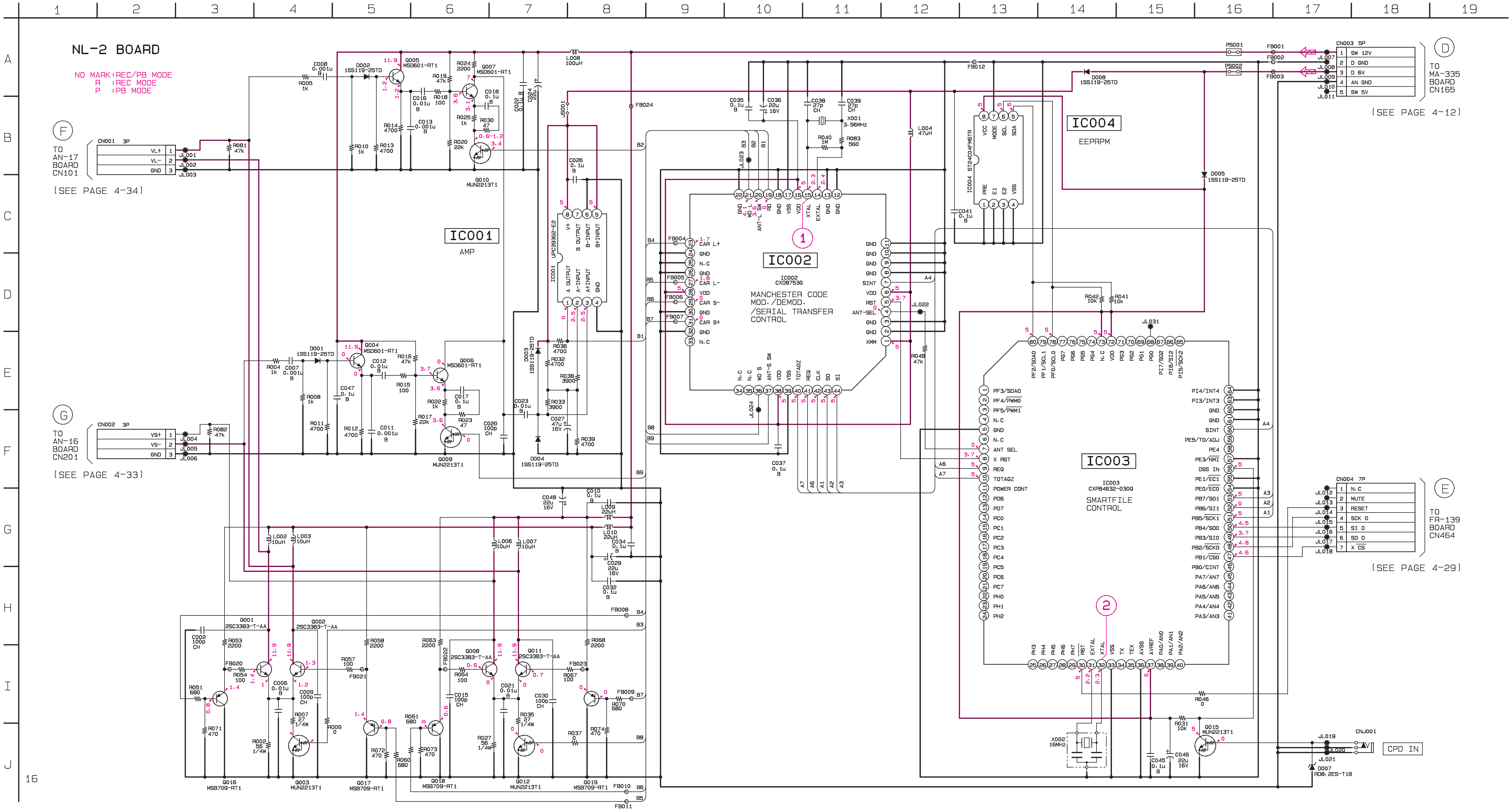


NL-2 BOARD



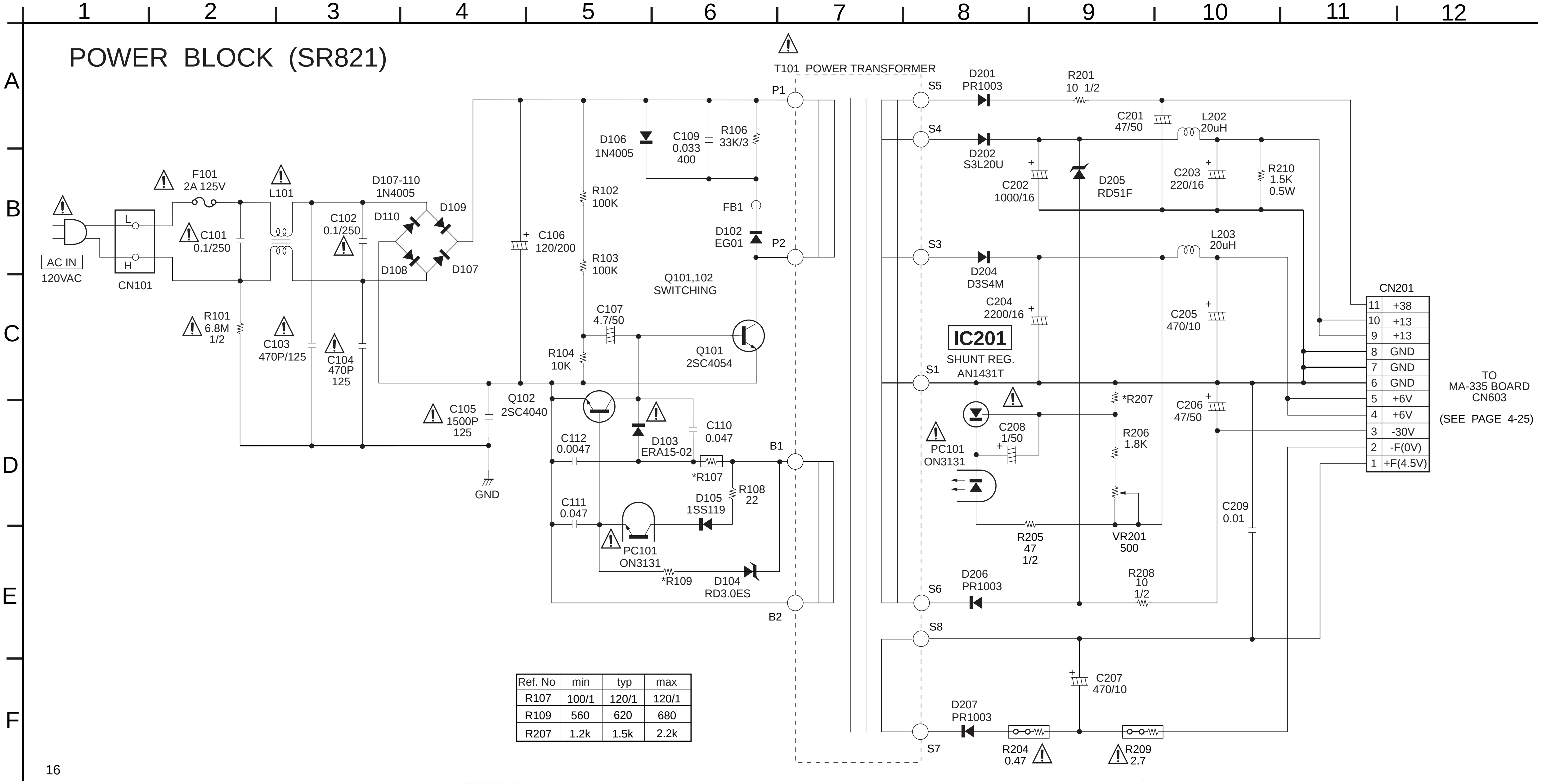
NL-2 (SMARTFILE) SCHEMATIC DIAGRAM

— Ref. No.: NL-2 Board; 3,000 Series —



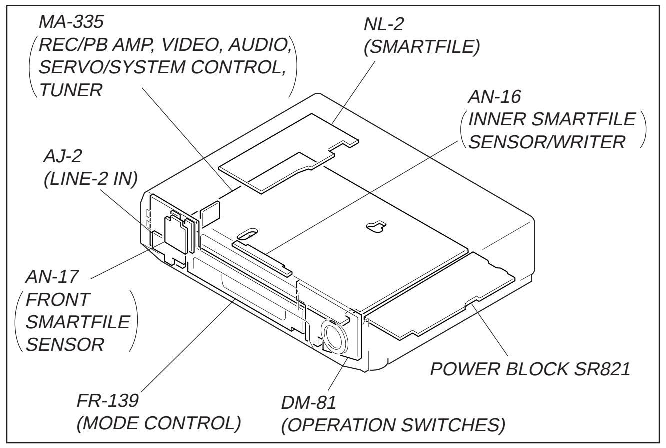
POWER BLOCK SR821 (SWITCHING REGULATOR) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM
— Ref. No.: SR821 Board; 9,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.

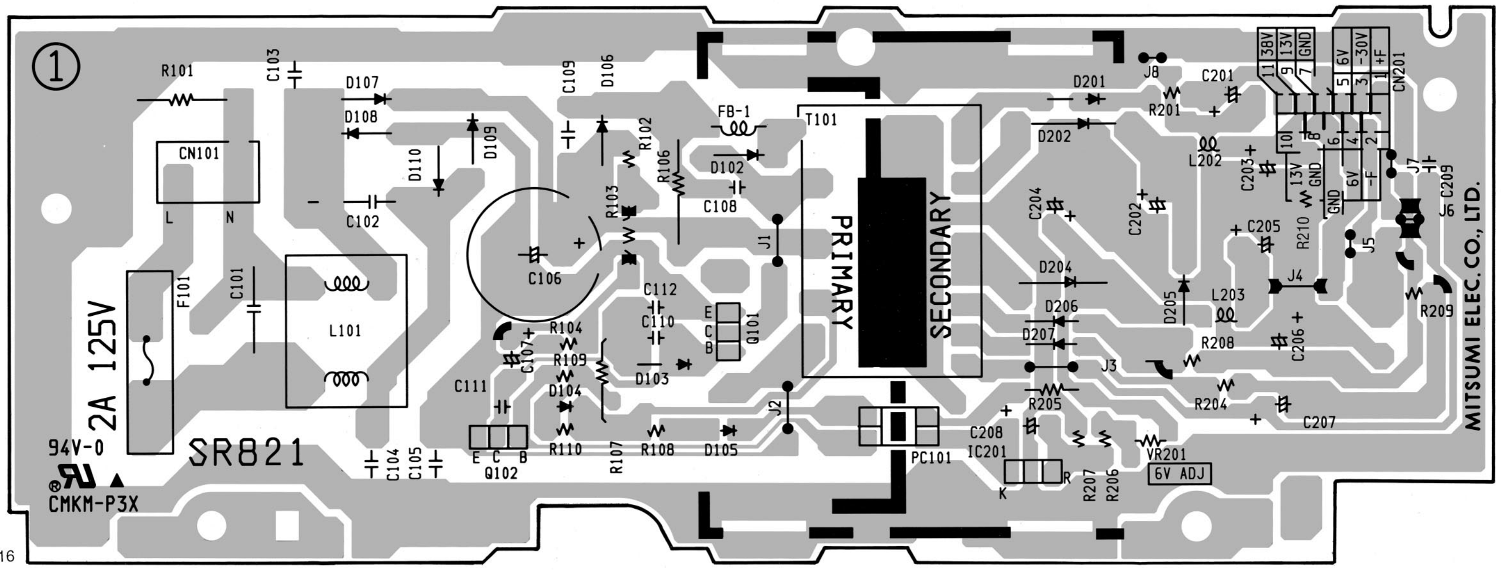


Ref. No	min	typ	max
R107	100/1	120/1	120/1
R109	560	620	680
R207	1.2k	1.5k	2.2k

Note :	Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



SR821 (CONDUCTOR SIDE)



SECTION 5
INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. SYSTEM CONTROL — VIDEO BLOCK INTERFACE (MA-335 BOARD IC161)

Signal	Pin No.	I/O	STOP FF/REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	x 2	CUE	REVIEW	REC	REC PAUSE
RF SWP	①	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
QVD	④	O	L	L	L	*2	*3	*3	*2	*3	*3	L	L
V SYNC	⑥⑥	I	*4	*5	*5	*5	*5	*5	*5	*5	*5	*5	*5
NT JUDGE	⑬	O	L	L	L	L	L	L	L	L	L	L	L

*1 Synchronized with drum rotation. 30Hz 50% duty cycle.
*2 Normally “L“. “H“ when CTL signal is not generated.
*3 V period “H“ pulse.
*4 Selected by REC mode. “H“ in LP mode.“
*5 Composite sync signal (positive).

5-2. SYSTEM CONTROL — SERVO PERIPHERAL CIRCUIT INTERFACE (MA-335 BOARD IC161)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTHREADING	PB	PB PAUSE	SLOW	CUE	x 2	REVIEW	REC	REC PAUSE
REC CTL	⑦	O	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	*1	Hi-Z
CAP STOP	㉟	O (O.D)	L	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)	L	*3	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)	Hi-Z (O.D)
STEP PLS	⑨⑨	O	L	L	L	L	L	L	L	*2	L	L	L	L	L
PB CTL	⑥⑦	I	H	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H
DRM PG	⑥⑧	I	*4	*1	*1	*5	*5	*1	*1	*1	*1	*1	*1	*1	*1
DRM FG	⑥⑨	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7
CAP FG	⑦⓪	I	H/L	*6	*6	*5	*5	*6	H/L	*2	*6	*6	*6	*6	H/L
CAP DA	⑦③	O	*8	*8	*8	*8	*8	*9	*8	*8	*9	*8	*9	*9	*8
DRM DA	⑦④	O	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10	*10
CTL RESET	⑧	I/O	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z	*11	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Hi-Z

*1. 30Hz pulse.
*2. Pulse at tape running.
*3. Reverse logic pulse of STEP PLS.
*4. “L” when drum rotation stops.
*5. Unstable period pulse.
*6. Pulse in period in proportional to tape speed.
*7. 360Hz pulse.
*8. Pulse at tape running.
*9. Approx. 2 msec period “H” or “L” pulse.
*10. Approx. 1.5 msec period “H” or “L” pulse.
*11. “L” when FWD SLOW, “H” when RVS SLOW.

5-3. SYSTEM CONTROL — MECHANISM INTERFACE (MA-335 BOARD IC161)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOADING	CASSETTE UNLOADING	TAPE THREADING	TAPE UNTHREADING	STOP	FF	REW	PB	PB PAUSE	SLOW	x 2	CUE	REVIEW	REC	REC PAUSE
CAM2	9	HI-Z	L	H	L	H	L	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
MODE 1 (*8)	22	I	H	L	L	*1	*1	H	H	H	H	H	H	H	H	L	H	H
MODE 2 (*8)	21	I	H	L	L	*1	*1	H	H	H	L	L	L	L	L	L	L	L
MODE 3 (*8)	20	I	L	L	L	*1	*1	H	L	L	L	L	L	L	L	H	L	L
MODE 4 (*8)	19	I	L	H	H	*1	*1	L	H	H	H	L	L	L	L	L	L	L
(IN REC PRF)	15	I	H	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
T REEL FG	64	I	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
S REEL FG	63	I	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
T/E LED	32	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP STOP	35	O (O.D)	L	L	L	H	H	L	H	H	H	L	*5	H	H	H	H	L
CAP RVS	72	O	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
T SENS	61	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6
S SENS	62	I	*4	*4	*4	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6	*6

*1. Uncertainly.
*2. "L" when erasing protection tab is bent. "H" when not bent.
*3. Pause of period in proportion to reel rotating speed.
*4. Approx. 2 msec period "H" pulse.
*5. Pulse at tape running.
*6. Normally "L". 2 msec period "H" pulse when tape top or tape end is detected.
*7. When transition to UNLOADING direction : "L".
When transition to LOADING direction : "H".
When CAM MOTOR is stopped : Hi-Z.
*8. When RVS slow : Mode 1="L"
When RVS slow : Mode 2="L"
When RVS slow : Mode 3="H"
When RVS slow : Mode 4="L"

5-4. SYSTEM CONTROL — SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-335 BOARD IC161)

Signal	Pin No.	I/O	I/O Level
ASURA RESET	40	I	Normally "H", "L" when service interruption is detected or restored.
ASURA CS	44	I	Chip select signal from timer microprocessor. V period "L" pulse.
S IN 0	45	I	Serial communication data from timer microprocessor. V period " L" pulse.
S OUT 0	46	O	Serial communication data to timer microprocessor. V period "L" pulse.
S CLK	47	I	Serial communication clock from timer microprocessor. V period "L" pulse.

5-5. SYSTEM CONTROL — AUDIO BLOCK INTERFACE (MA-335 BOARD IC161)

Signal	Pin No.	I/O	STOP/FF/ REW	TAPE LOADING	TAPE UNLOADING	PB	PB PAUSE	SLOW	x 2	CUE	REVIEW	REC	REC PAUSE
AF ENV	59	I	AF RF envelope signal input terminal for automatic tracking.										
A MUTE	31	O (O.D)	L	L	L	*1	H	H	H	H	H	L	L
AF REC P	2	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	100	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
FULL ERS	36	O (O.D)	H	H	H	H	H	H	H	H	H	L	H

*1. 30 Hz 50 % duty pulse approx. 5 msec delayed from RF SW P.

5-6. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTIONS (MA-335 BOARD IC161)

Pin No.	Pin Name	I/O	Function
1	RF SWP	O	RF switching pulse output.
2	AF REC $\overline{\text{P}}$	O	“H” when HiFi audio REC.
3	N.C.	—	Not used.
4	QVD	O	Quasi VD pulse output.
5	AUTO PRESET	O	“H” during auto preset.
6	FE ON	O	Flying erase ON/OFF
7	REC CTL	O	REC CTL signal output.
8	CTL RESET	O	Capstan current control. “H” during slow mode.
9	CAM 2	I	Cam motor control.
10	N.C.	—	Not used.
11	TA MUTE	O	Tuner audio mute. H: Mute
12	$\overline{\text{S-VHS}}$	I	S-VHS tape detection signal in.
13	NT JUDGE	I	Not used.
14	MESECAM DET	I	Not used.
15	CIN (REC PRF)	I	Erasing protection tab, cassette in detection signal input.
16	AV CONT	O	Not used.
17	$\overline{\text{SECAM ON}}$	—	Not used.
18	SW1	—	Not used.
19	MODE 4	I	Cam encoder signal input.
20	MODE 3	I	Cam encoder signal input.
21	MODE 2	I	Cam encoder signal input.
22	MODE 1	I	Cam encoder signal input.
23	POWER SAVE CONT 1	O	Not used.
24	POWER SAVE C+	O	Not used.
25	MOD CONT	O	Not used.
26	$\overline{\text{TV}}$/VTR	O	$\overline{\text{TV}}$/VTR control signal output.
27	N.C.	—	Not used.
28	SDA 0	I/O	I^{2}C data.
29	N.C.	—	Not used.
30	SCL 0	I/O	I^{2}C clock.
31	A MUTE	O	“H” when audio mute.
32	T/E LED	O	Tape top/end sensors driver.
33	N.C.	—	Not used.
34	N.C.	—	Not used.
35	$\overline{\text{CAP STOP}}$	O	Capstan stop signal output.
36	FULL ERS	O	Full erase control.
37	N.C.	—	Not used.
38	N.C.	—	Not used.
39	MP	I	Fixed to “L”.
40	$\overline{\text{ASURA RESET}}$	I	System reset signal.
41	VSS	—	Ground.
42	XTAL	O	System clock 16MHz.
43	EXTAL	I	System clock 16MHz.
44	$\overline{\text{ASURA CS}}$	I	Servo/system control microcomputer chip select signal.
45	S IN 0	I	Serial communication signal.
46	S OUT 0	O	Serial communication signal.
47	$\overline{\text{SCLK}}$	I	Serial communication signal.
48	NICOL ON	O	NICOL control signal out.
49	CBC POWER	O	Cable box control signal out.
50	F. MONO	O	Forced mono.

Pin No.	Pin Name	I/O	Function
51	SW2	O	Not used.
52	AVSS	—	Unswitched ground.
53	AVREF	—	AD port reference input UNSW 5V.
54	AVDD	—	UNSW 5V.
55	NTPB SW	I	Not used.
56	AV ADJ	I	Adjustment mode.
57	$\overline{\text{FOLLOW TV}}$	I	Not used.
58	N.C.	—	Not used.
59	AF ENV	I	HiFi audio playback signal envelope.
60	RF ENV	I	Video playback signal envelope.
61	T SENS	I	Take-up end sensor.
62	S SENS	I	Supply end sensor.
63	S REEL FG	I	Supply reel FG input.
64	T REEL FG	I	Take-up reel FG input.
65	N.C.	—	Not used.
66	VSYNC	I	Composite sync. signal input.
67	$\overline{\text{PB CTL}}$	I	Playback CTL input.
68	DRM PG	I	Drum PG input.
69	DRM FG	I	Drum FG input.
70	CAP FG	I	Capstan FG input.
71	BLUE BACK ON	O	Not used.
72	CAP RVS	O	Capstan reverse control “H” when reverse.
73	CAP DA	O	Capstan error D/A output.
74	DRM DA	O	Drum PG output.
75	N.C.	—	Not used.
76	N.C.	—	Not used.
77	REC COUNT	I	Counter signal input when recording.
78	C PLUS DET	O	Not used.
79	N.C.	—	Not used.
80	DATA (SSB)	O	Serial communication data.
81	CLOCK (SSB)	O	Serial communication clock.
82	N.C.	—	Not used.
83	N.C.	—	Not used.
84	CAP TRQ PWM	O	PWM output for capstan torque control.
85	N.C.	—	Not used.
86	N.C.	—	Not used.
87	N.C.	—	Not used.
88	VSS	—	Ground.
89	VDD	—	5V.
90	5V	—	5V.
91	N.C.	—	Not used.
92	CTL HYS HIGH	O	CTL amp gain control.
93	N.C.	—	Not used.
94	N.C.	—	Not used.
95	N.C.	—	Not used.
96	AF REC	O	“H” output when hifi audio recording.
97	N.C.	—	Not used.
98	N.C.	—	Not used.
99	STEP PLS	O	Step pulse “H” when capstan step driving.
100	AF SWP	O	AF switching pulse output.

5-7. TUNER/TIMER MODE CONTROL PIN FUNCTIONS (FR-139 BOARD IC460)

Pin No.	Pin Name	I/O	Function
1	N.C.	I	Not used.
2	POWER FAIL	I	Power failure detect signal input.
3	H DET	I	H DET_(TUNER H SYNC detect input).
4	SIRCS IN	I	Remote control signal (SIRCS) input.
5	STEREO DET	I	Stereo judge input.
6	SW1 SIRCS OUT	O	Remote control signal (SIRCS) output.
7	BUZZER	O	Buzzer signal output.
8	MUTE	O	MUTE control.
9	RESET	O	Not used.
10	SCK 0	I	Serial communication signal (Serial clock).
11	SI 0	I	Serial communication signal (Data input).
12	SO 0	O	Serial communication signal (Data output).
13	EEP WC	O	EEP mode control.
14	LANC IN	I	LANC input.
15	LANC OUT	O	LANC output.
16	A/D 0	I	Analog voltage (KEY) input.
17	A/D 1	I	Analog voltage (KEY) input.
18	A/D 2	I	Analog voltage (KEY) Input.
19	A/D 3	I	Analog voltage (KEY) Input.
20	A/D 4	I	Analog voltage (KEY) Input.
21	ML LED	O	ML LED ON/OFF control.
22	X CS	O	NL-2 board IC003 chip select signal out.
23	AFT	I	AFT (Auto fine tuning signal input).
24	AVDD	I	A/D port reference input.
25	AV REF		UNSW 5V.
26	SCL 0	O	T BUS (clock) /IIC BUS (clock).
27	CG CS	O	Character generator chip select signal.
28	SDA 0	O	IIC BUS (data).
29	JOG LED	O	JOG LED control signal output.
30	AVSS	I	UNSW ground.
31	EXTAL		System clock terminal (16MHz).
32	XTAL		System clock terminal (16MHz).
33	VSS		Ground.
34	RST	I	RESET input.
35	PLL CLK	O	TUNER PLL clock.
36	PLL DATA	O	TUNER PLL data.
37	PLL ENABLE	O	TUNER chip select.
38	MAIN/SAP	O	NO USE (MAIN/SAP judge signal output).
39	SAP DET	O	MAIN/SAP judge input.
40	V SET CS	O	V SET IC chip select signal.
41	DMS 1	I	DMS forward/reverse signal input.
42	DMS 2	I	DMS forward/reverse signal input.
43	VFDP	I	VFDP.
44	SEG1	O	Segment terminal 1
45	SEG2	O	Segment terminal 2
46	SEG3	O	Segment terminal 3
47	SEG4	O	Segment terminal 4
48	SEG5	O	Segment terminal 5
49	SEG6	O	Segment terminal 6
50	SEG7	O	Segment terminal 7
51	SEG8	O	Segment terminal 8.
52	SEG9	O	Segment terminal 9.
53	SEG10	O	Segment terminal 10.
54	SEG11	O	Segment terminal 11.
55	SEG12	O	Segment terminal 12.
56	SEG13	O	Segment terminal 13.
57	SEG14	O	Segment terminal 14.
58	SEG15	O	Segment terminal 15.
59	SEG16	O	Segment terminal 16.
60	NC		Non Connect.
61	NC		Non Connect.
62	GRID10	O	Grid terminal 10.
63	GRID9	O	Grid terminal 9.
64	GRID8	O	Grid terminal 8.
65	GRID7	O	Grid terminal 7.
66	GRID6	O	Grid terminal 6.
67	GRID5	O	Grid terminal 5.
68	GRID4	O	Grid terminal 4.
69	GRID3	O	Grid terminal 3.
70	GRID2	O	Grid terminal 2.
71	GRID1	O	Grid terminal 1.
72	VDD		D5V
73	TX		Timer clock terminal (32.768kHz).
74	TEX		Timer clock terminal (32.768kHz).
75	NC/VPP	O	D5V
76	ASURA CS	O	S/S microcomputer chip select signal.
77	SYS RESET	O	System reset output.
78	POWER CONT 1	O	Power supply control signal.
79	POWER CONT 2	O	Power supply control signal.
80	CG V	I	Composite sync input.

SECTION 6
ADJUSTMENTS

6-1 MECHANICAL ADJUSTMENTS

For the mechanical adjustments, please refer to the "VHS MECHANICAL ADJUSTMENT MANUAL Ⅵ (S MECHANISM)" (9-921-647-11).

6-2. ELECTRICAL ADJUSTMENTS

See the adjusting parts location diagram from on page 6-8 for the adjustment.

2-1. PREPARATION BEFORE ADJUSTMENT

2-1-1. Equipment Required

The measuring instruments used for this alignment include:

1) Monitor TV
2) Oscilloscope, dual-trace, bandwidth of 30MHz or more, with delay mode (A probe 10:1 should be used unless otherwise specified.)
3) Frequency counter
4) Pattern generator
5) Digital voltmeter
6) Audio generator
7) Audio level meter
8) Audio distortion meter
9) Audio attenuator
10) Alignment tapes
    KRV-51N2 Part No.: 8-192-605-32

2-1-2. Equipment Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

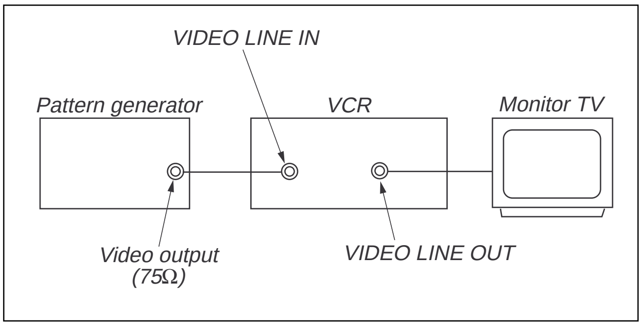


Fig. 6-2-1.

2-1-3. Input Signal Check

Video signal produced by a pattern generator is used as an adjustment signal to perform electrical alignment for this unit. This video signal must satisfy the specification.

Unless otherwise specified, place the switches and controls of this unit in the following positions:

• INPUT SELECT switch .... LINE or LINE 1 (Remote commander)

Connect an oscilloscope to the Video Input terminal. Check that the synchronizing signal of the Y signal has an amplitude of approximately 0.7V and that the burst signal has an amplitude of approximately 0.3V and its waveform is flat. And check that the level ratio of burst signal to "red" signal is 0.30 : 0.66. The video signal (color bar) used for electrical aligning this unit is shown in Fig. 6-2-2.

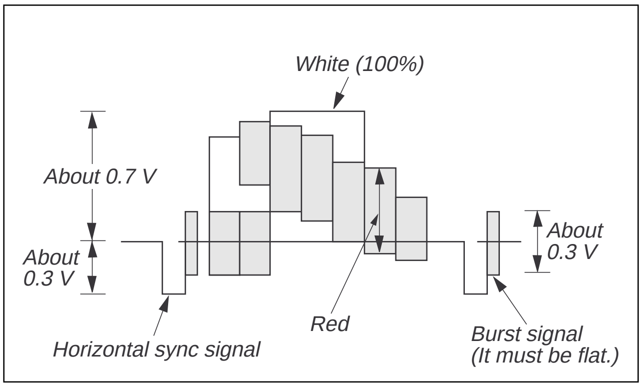


Fig. 6-2-2. Color Bar Signals of Pattern Generator

2-1-4. Alignment Tape

• Contents of KRV-51N2

	Mode	Period	Video signal	Audio signal	
				Hi-Fi	Normal
1	SP	7 minutes	Color bar	400Hz	400Hz
2		3 minutes	Monoscope		
3	EP	7 minutes	Color bar		
4		3 minutes	Monoscope		

2-1-5. Input/Output Levels and Impedance

Video input: LINE IN
Input signal: 1Vp-p, 75ohms, unbalanced, sync negative

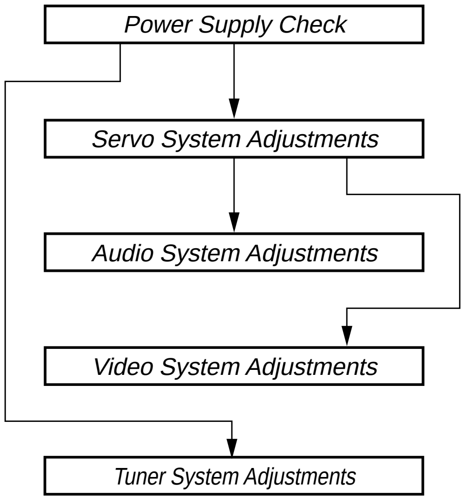
Video output: LINE OUT
Output signal: 1Vp-p, 75ohms, unbalanced, sync negative

Audio input: LINE IN
Input level: –7.5 dBs
(0dBs= 0.775Vrms)
Input impedance: more than 47 kilohms

Audio output: LINE OUT
Standard level: –7.5dBs at load impedance 47 kilohms
Output impedance: less than 10 kilohms

2-1-6. Adjustment Sequence

The adjustments should be performed in the following sequence.



2-2. POWER SUPPLY CHECK

2-2-1. Output Voltage Check (MA-335 Board)

Mode	E-E
Measuring Instrument	Digital voltmeter
SW 12V Check	
Measurement point	IC601 pin ②
Specified value	12.0 ± 0.3V
MTR12V Check	
Measurement point	Q605 ⓒ
Specified value	13.2 ± 1.0V
SW5V Check	
Measurement point	Q603 Ⓔ
Specified value	5.1 ± 0.3V

[Check Method]

1) Each of these supply voltages must meet its specified value.

2-3. SERVO SYSTEM CHECK

Unless otherwise specified, set the switches to the following positions.

- INPUT SELECT switch .... LINE 1
- TAPE SPEED switch .... SP (Remote commander)

2-3-1. RF Switching Position/ AF Switching Position Adjustments (MA-335 Board)

[Adjustment Purpose]

To adjust the link of the A-ch and B-ch of the tape playback outputs. To make the unit compatible with other tapes and units. If this specification is not satisfied, the link will appear on the screen and the screen will be disrupted, etc.

Mode	Playback
Signal	Alignment tape: SP color bar portion
Measurement point	CH1: Video LINE OUT (RF switching position) CN341 pin ① (HF ADJ) (AF switching position) CH2: CN261 pin ③ (RF SWP)
Measuring instrument	Oscilloscope
Specified value	6.5 ± 0.5H (410 ± 32 µsec)

[Adjustment Method]

1) Short-circuit between JS161 and ground for about 1 second to activate the RF switching position adjustment mode.
2) Check that "AP" is indicated on FL display.
3) Using the channel + and – buttons, adjust to 410 ± 32 µsec (6.5 ± 0.5H).
4) Press the PAUSE button. (Adjustment is over for mono models.)
5) The set goes to the AF switching position adjustment mode.
6) Check that "AH" is indicated on FL display.
7) Using the channel + and – buttons, minimize a chipped portion. At this time, confirm that a noisy sound is not heard.
8) Press the PAUSE button.
9) Check that "AH" indication is disappeared. When it is not disappeared, repeat from the item 1).
10) Press the STOP button.
11) Press the EJECT button.

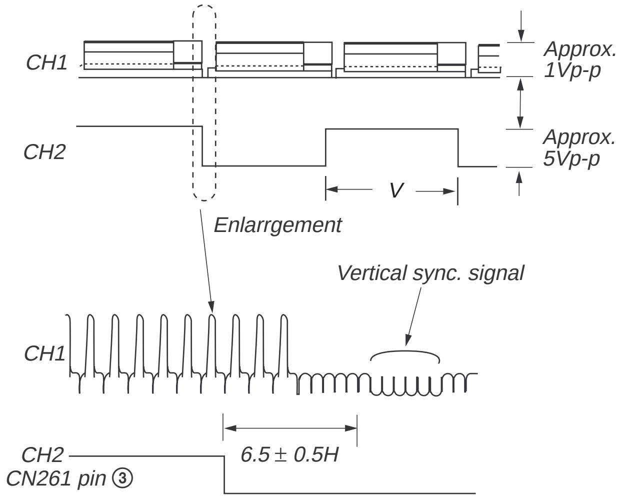


Fig. 6-2-3.

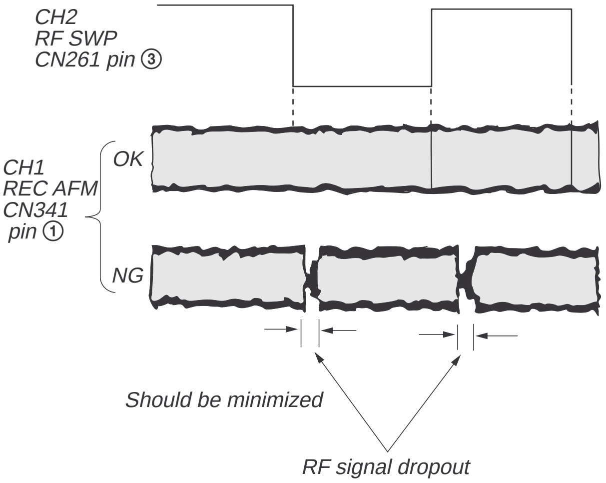


Fig. 6-2-4.

2-4. VIDEO SYSTEM CHECKS

For the video system checks, follow the checking procedures given below as a rule. The color bar video signal supplied from the pattern generator is used as the video input signal for the video system adjustment of the recording mode. Check that the signal satisfies the specified value designated in the "Check of input signal" (Fig. 6-2-2)

Unless otherwise specified, set the switches to the following positions.

- INPUT SELECT switch .... LINE 1
- TAPE SPEED switch .... SP (Remote commander)

[Checking Sequence]

1) X'tal OSC Check
2) SYNC AGC Check
3) Recording Y Level Check
4) Recording Chroma Level Check
5) Playback Level Check

2-4-1. X'tal OSC Check (MA-335 Board)

Mode	Playback
Signal	Alignment tape: SP Color bar portion
Measurement point	IC201 pin (56)
Measuring instrument	Oscilloscope and Frequency counter
Specified value	3,579,545 ± 70Hz

Note: A frequency counter should be connected through a buffer amplifier (oscilloscope, etc.) having a high impedance and a low capacitance.

[Check Method]

1) Check that the oscillation frequency satisfies the specified value and that the oscillation voltage is 500 ± 200mVp-p.

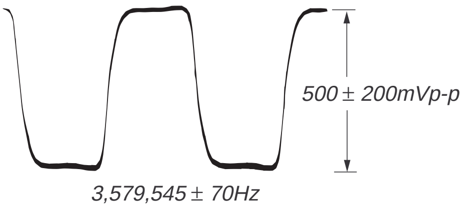


Fig. 6-2-5.

2-4-2. SYNC AGC Check (MA-335 Board)

Mode	E-E
Signal	Color bar
Measurement point	IC201 pin ㊳
Measuring instrument	Oscilloscope
Specified value	A=2.10 ± 0.10Vp-p

[Check Method]

1) Check that the Video signal level (A) satisfies the specified value.

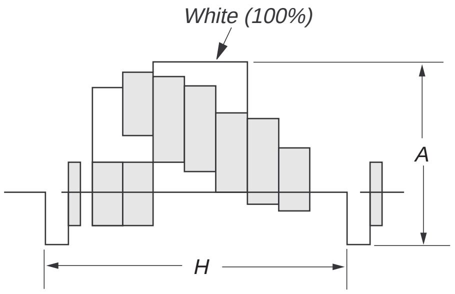


Fig. 6-2-6.

2-4-3. Recording Y Level Check (MA-335 Board)

Mode	E-E (SP)
Signal	No-signal
Measurement point	IC201 pin ⑱
Measuring instrument	Oscilloscope
Specified value	A=290 ± 70mVp-p

[Check Method]

1) Check that the recording RF signal satisfies the specified value.

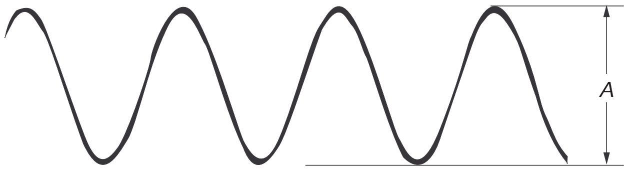


Fig. 6-2-8.

2-4-4. Recording Chroma Level Check (MA-335 Board)

Mode	Recording (SP)
Signal	Color bar
Measurement point	IC201 pin ⑭
Measuring instrument	Oscilloscope
Specified value	A=450 ± 70mVp-p

[Check Method]

1) Confirm the amplitude of recording chroma level becomes the specified value.

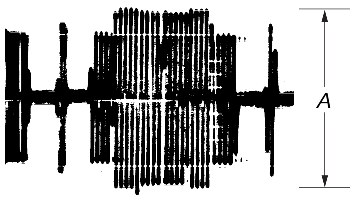


Fig. 6-2-9.

2-4-5. Playback Level Check (MA-335 Board)

Mode	Playback
Signal Alignment	Alignment tape : SP mode color bar portion
Measurement point	Video LINE OUT terminal
Measuring instrument	Oscilloscope
Specified value	A=1.0 ± 0.1Vp-p (75Ω terminated)

[Check Method]

1) Check that the playback level satisfies the specified value.

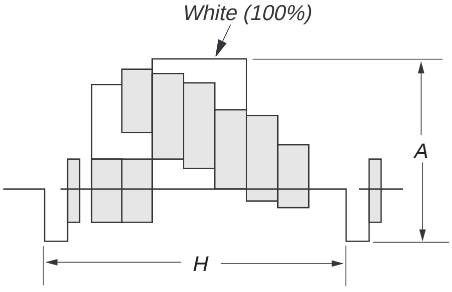


Fig. 6-2-10.

2-5. AUDIO SYSTEM ADJUSTMENT

• For the adjustment of the audio system, perform in the SP mode if there is no special notes. Use the alignment tape.

[Connecting Instruments]

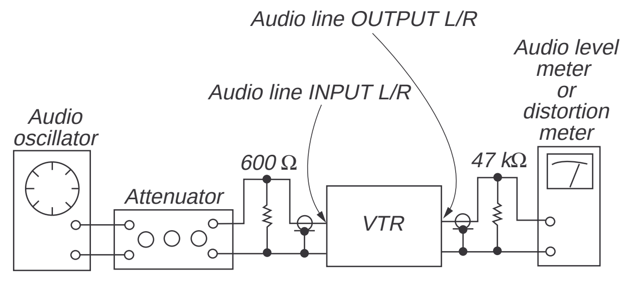


Fig. 6-2-11.

• Adjust in the SP mode if there is no special indications.
• Perform the adjustment setting the switch on the following positions.
• INPUT SELECT switch .... LINE 1

[Adjustment Method]

1. ACE head adjustment.....Refer to the VHS mechanical adjustment manual Ⅵ (S MECHANISM)(9-921-647-11).
2. E-E output level check
3. Overall Output level and distortion factor check
4. Overall noise level check.

2-5-1. ACE Head Adjustment

Refer to the VHS mechanical adjustment manual Ⅵ (S MECHANISM)(9-921-647-11).

2-5-2. E-E Output Level Check

Mode	E-E
Signal	400Hz, –7.5dBs : CJ570
Measurement point	CJ570
Measuring instrument	Audio level meter
Specified value	–7.5 ± 2dBs

[Check Method]

1) Input signal of 400Hz and –7.5dBs to the CJ461 L/R.
2) Check that the audio output level is –7.5 ± 3dBs.

2-5-3. Overall Output Level and Distortion Factor Check

Mode	Self-record playback
Signal	400Hz, –7.5dBs : CJ570
Measurement point	CJ570
Measuring instrument	Audio level meter and Distortion meter
Specified value	Playback Level: –7.5 ± 3dBs Distortion: 4.0% or less

[Check Method]

1) Input signal of 400Hz and –7.5dBs to the audio input.
2) Record signal.
3) Playback the recorded portion.
4) Check that the output level is –7.5 ± 3dBs.
5) Check that the distortion factor is 4.0% or less.

2-5-4. Overall Noise Level Check

Mode	Self-record playback
Signal	No signal (Insert a shorting plug into the Audio LINE IN terminal)
Measurement point	CJ570
Measuring instrument	Audio level meter
Specified value	– 45.5dBs or less

[Check Method]

1) Record.
2) Playback recorded portion.
3) Check that noise level is – 45.5dBs or less.

2-6. TUNER SYSTEM ADJUSTMENT

2-6-1. Separation Adjustment (MA-335 Board)

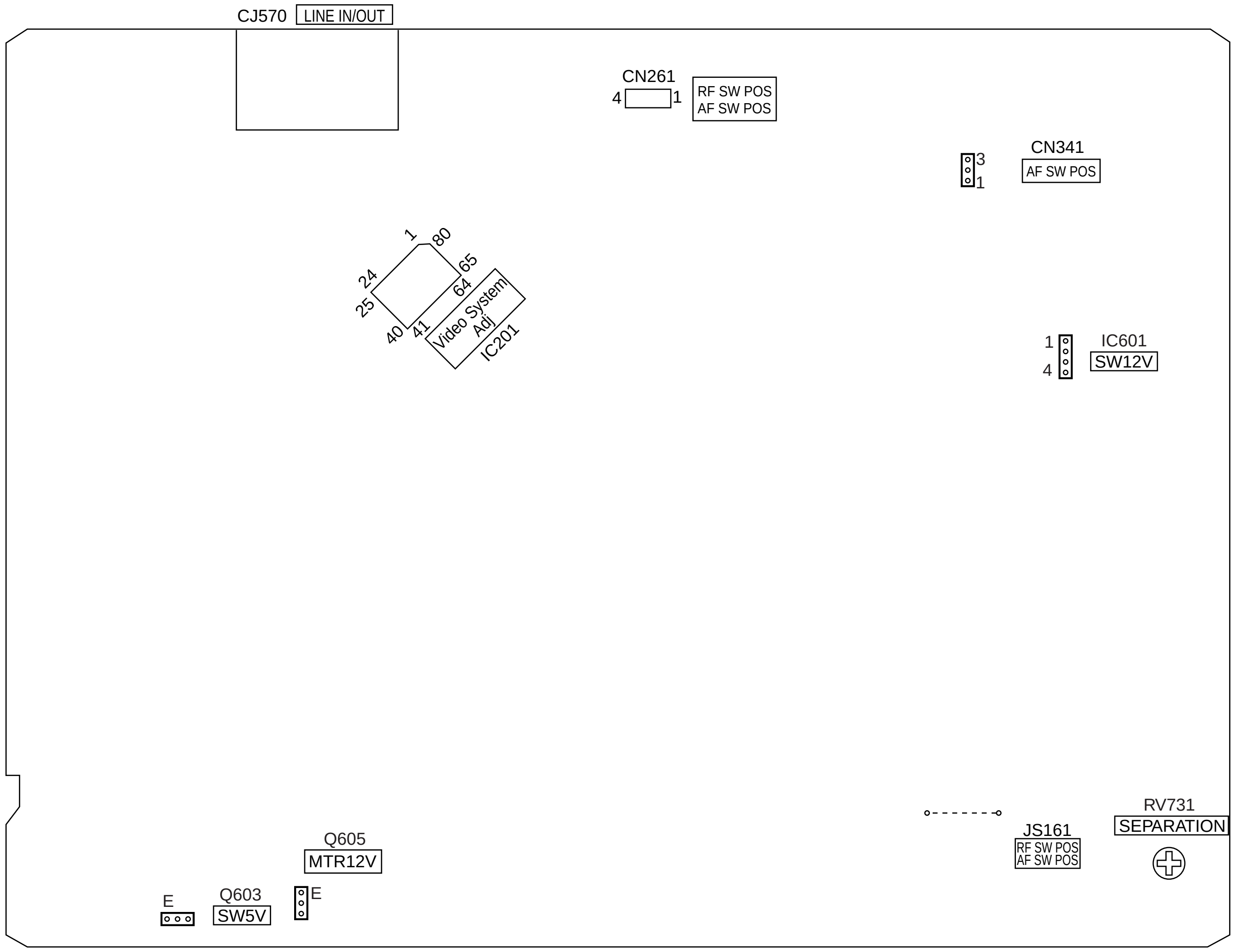
Mode	E-E
Signal	RF signal Video : Color bar white (100%) modulation Audio : L: 400Hz, R: 2kHz 30% modulation Electrical field: 60-80dBm/75Ω terminated
Measuring instrument	Audio level meter
Measuring point	LINE OUT L
Adjusting element	RV731
Specified value	2kHz component minimum

[Adjustment Method]

1) Connect an audio level meter to LINE OUT L channel via HPF.
2) Feed the RF signal from RF IN terminal.
3) Adjust with RV731 so that the output level satisfies the specified value.

2-7. ADJUSTING PARTS LOCATION DIAGRAM

MA-335 BOARD (CONDUCTOR SIDE)



SECTION 7
REPAIR PARTS LIST

7-1. EXPLODED VIEWS

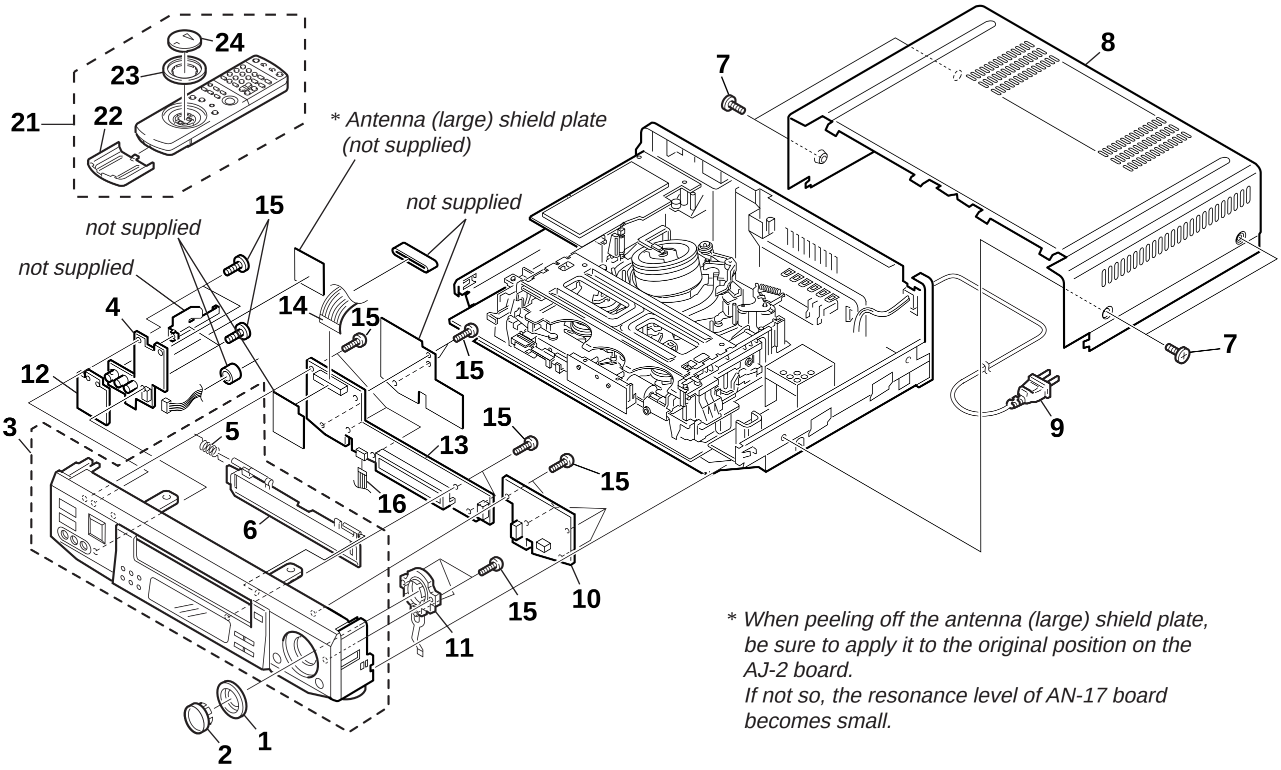
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (#mark) list is given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

7-1-1. FRONT PANEL ASSEMBLY AND UPPER CASE SECTION

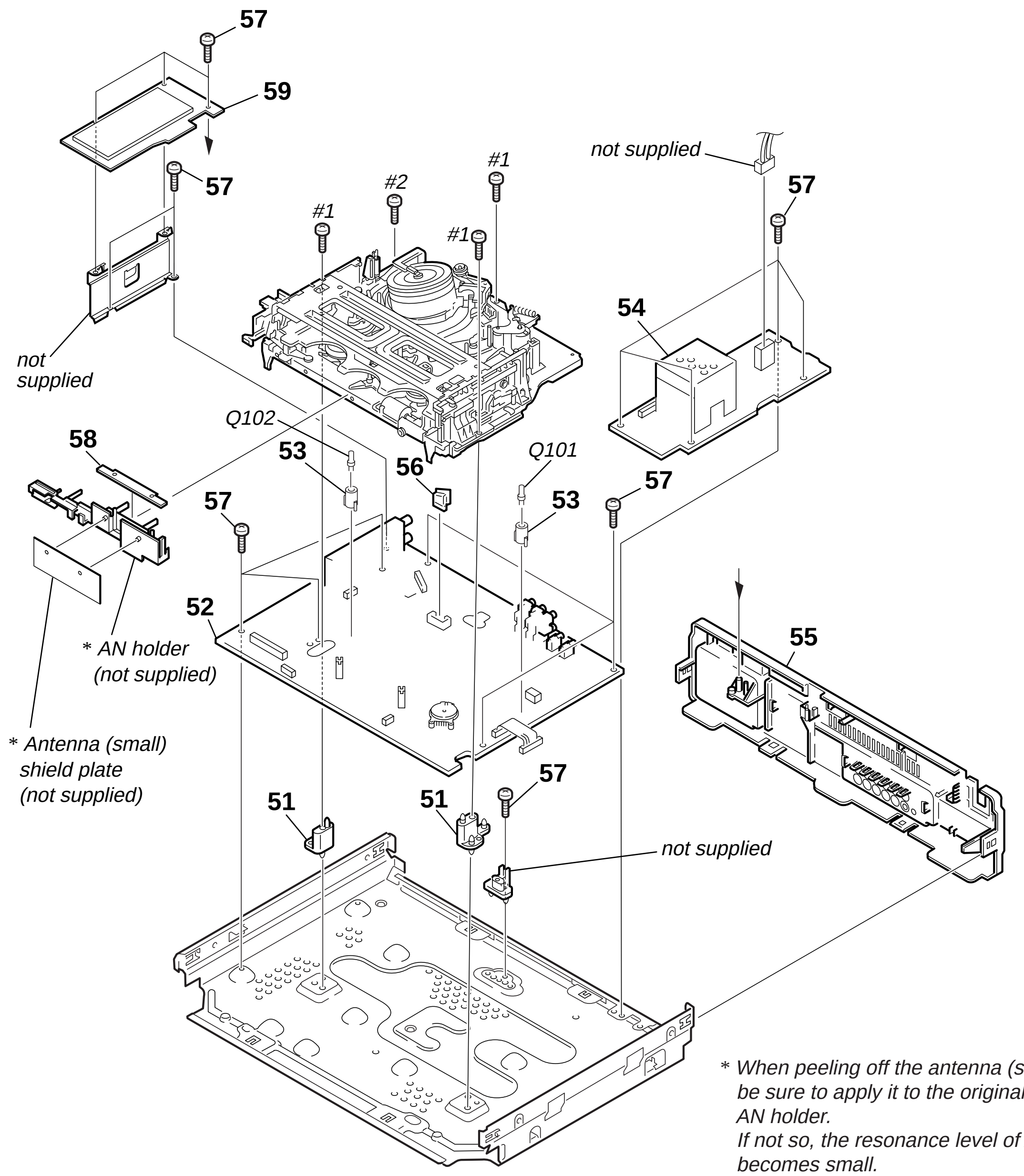


* When peeling off the antenna (large) shield plate, be sure to apply it to the original position on the AJ-2 board. If not so, the resonance level of AN-17 board becomes small.

Ref. No.	Part No.	Description	Remarks
1	3-979-310-01	RING (AV), JOG	
2	3-979-309-01	BUTTON (AV), CENTER	
3	X-3948-110-1	PANEL ASSY, FRONT	
* 4	A-6791-566-A	AJ-2A COMPL BOARD, COMPLETE	
5	3-953-432-01	SPRING (GE), FL	
6	3-979-302-51	DOOR (AV), CASSETTE	
7	3-710-901-11	SCREW, TAPPING	
8	3-979-313-01	CASE, UPPER	
⚠9	1-783-605-11	CORD, POWER	
* 10	A-6791-567-A	DM-81A BOARD, COMPLETE	

Ref. No.	Part No.	Description	Remarks
11	1-762-844-21	SWITCH, ROTARY	
* 12	A-6791-569-A	AN-17A BOARD, COMPLETE	
* 13	A-6791-568-A	FR-139A BOARD, COMPLETE	
14	1-783-546-11	CABLE, FLAT (FFM-24)	
15	4-921-277-41	SCREW (B2.6X8), TAPPING, BIND	
16	1-783-547-11	CABLE, FLAT (FFM-25)	
21	1-475-749-11	COMMANDER, STANDARD (RMT-V249)	
22	3-709-044-01	COVER, BATTERY	
23	3-973-077-31	RING, CHANGE SPEED	
24	3-972-850-01	BUTTON, FUNCTION	

7-1-2. CHASSIS SECTION

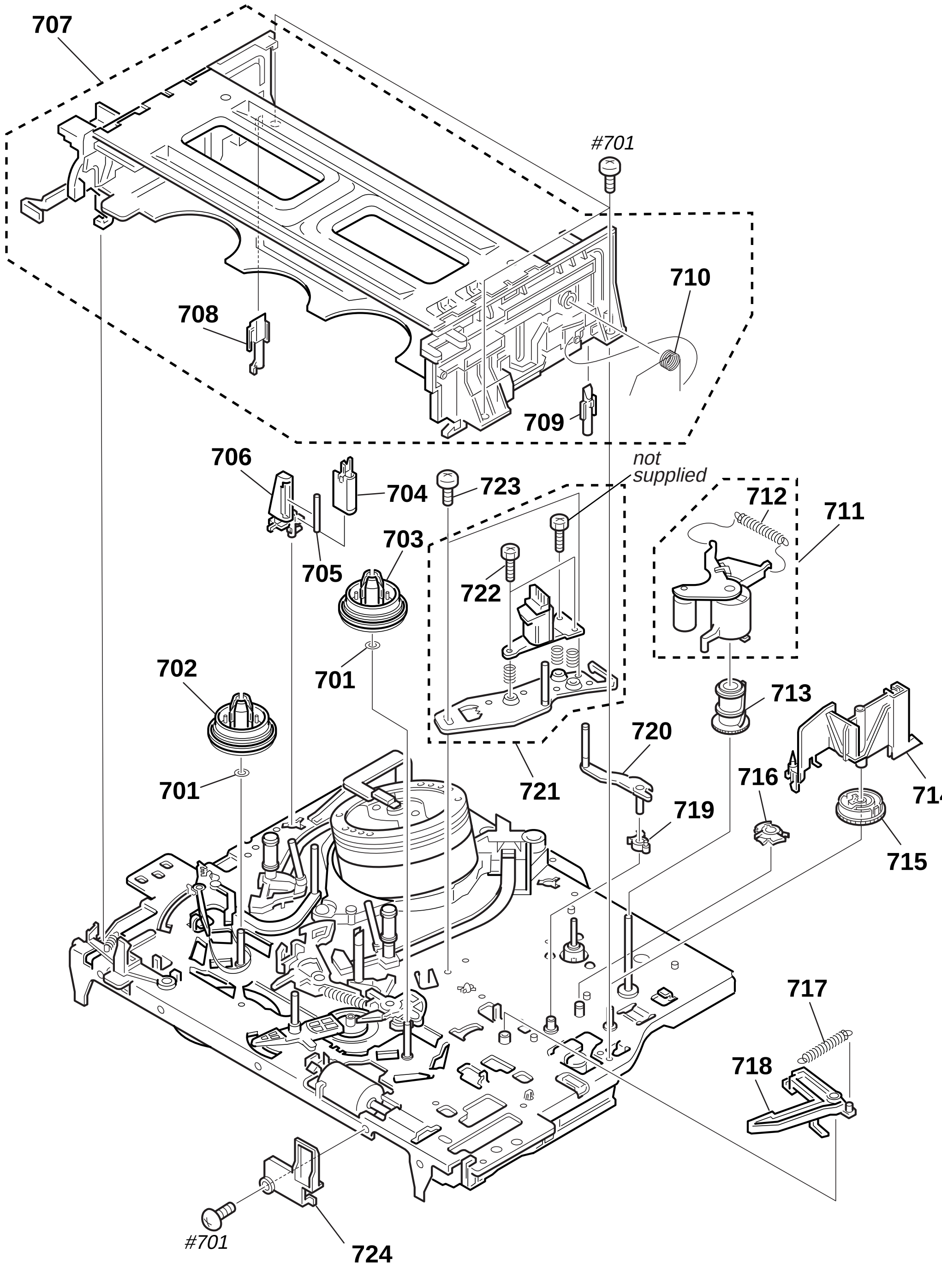


* When peeling off the antenna (small) shield plate, be sure to apply it to the original position on the AN holder.
If not so, the resonance level of AN-16 board becomes small.

Ref. No.	Part No.	Description	Remarks
51	3-979-314-01	BASE (R), MD	
* 52	A-6791-570-A	MA-335A COMPL BOARD, COMPLETE	
* 53	3-960-273-01	SPACER, TOP END	
⚠54	1-468-308-11	POWER BLOCK SR821	
* 55	3-979-564-21	PANEL, REAR	
56	1-779-725-11	CONNECTOR, BOARD TO BOARD 5P	
57	3-970-608-21	SUMITITE (B3), +BV	
* 58	A-6791-571-A	AN-16A BOARD, COMPLETE	
* 59	A-6791-572-A	NL-2A BOARD, COMPLETE	
Q101	8-729-043-84	TRANSISTOR PT380F3	
Q102	8-729-043-84	TRANSISTOR PT380F3	

Note :	Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

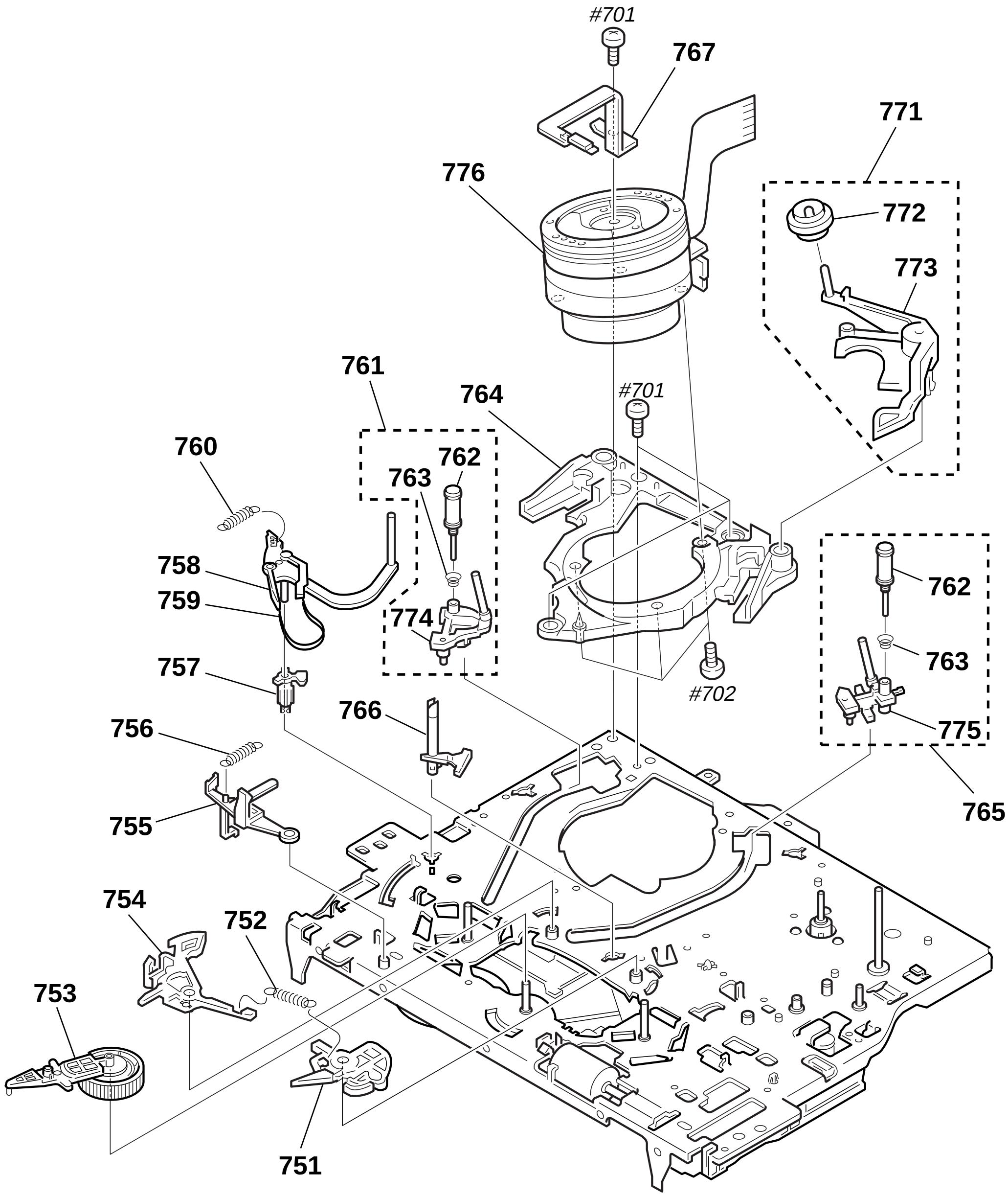
7-1-3. MECHANISM DECK-1



Ref. No.	Part No.	Description	Remarks
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S) (GRAY)	
703	3-977-508-01	TABLE, REEL (T) (BLACK)	
704	1-500-144-11	HEAD, FE	
705	3-977-495-01	SHAFT TG2	
706	3-977-494-01	HOLDER, FEH	
707	A-6759-619-C	FL COMPLETE ASSY	
708	3-977-535-01	PLATE, LUMINOUS(END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS(TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	
712	3-958-455-01	SPRING (PINCH), TENSION	

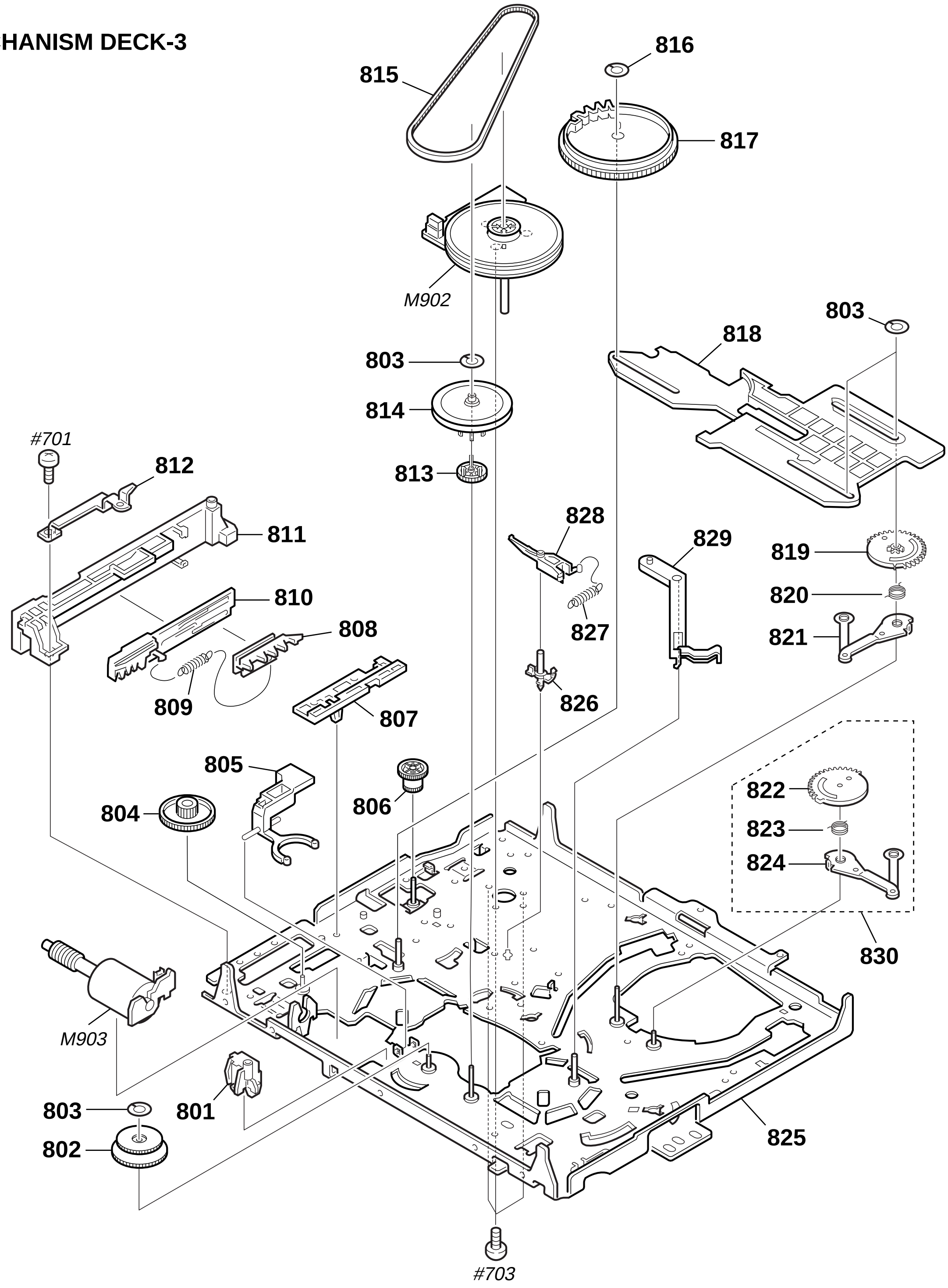
Ref. No.	Part No.	Description	Remarks
713	3-977-447-01	GEAR, ELEVATOR	
714	3-977-514-01	OPENER, LID	
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING,EXTENSION(RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
722	3-974-556-01	+ HEXA TT 2.6X9 (TAPER)	
723	3-979-508-01	SCREW	
724	3-978-485-01	PLATE, GUIDE CASSETTE	

7-1-4. MECHANISM DECK-2



Ref. No.	Part No.	Description	Remarks
751	X-3947-581-1	BRAKE ASSY,MAIN(T)	
752	3-977-462-01	SPRING,EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-2	BRAKE ASSY, MAIN(S)	
755	3-977-513-02	LEVER, REC. PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	
762	X-3944-378-1	ROLLER ASSY, GUIDE	
763	3-965-178-01	SPRING	
764	3-969-632-04	BASE, DRUM	
765	A-6750-325-A	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3943-899-8	GROUND ASSY, SHAFT	
771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-975-724-07	ARM, HC	
774	X-3946-855-1	SHUTTLE (S) ASSY	
775	X-3946-856-1	SHUTTLE (T) ASSY	
776	8-839-044-02	DRUM ASSY DZH-94A/Z-RP (M901)	

7-1-5. MECHANISM DECK-3



Ref. No.	Part No.	Description	Remarks
801	3-977-437-01	RETAINER,CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-02	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	
819	3-977-455-01	GEAR, LOADING(T)	
820	3-977-456-03	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING(T)	
822	3-977-451-01	GEAR, LOADING(S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING(S)	
825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-02	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
830	A-6759-616-A	GEAR BLOCK ASSY, LOADING	
M902	1-698-971-11	MOTOR, DC	
M903	X-3947-577-1	MOTOR ASSY, CAM	

7-2. ELECTRICAL PARTS LIST

NOTE:

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
uF: μF
- RESISTORS
All resistors are in ohms.
METAL: metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- COILS
uH: μH
- SEMICONDUCTORS
In each case, u: μ, for example:
uA...: μA... , uPA... , μPA... ,
uPB... , μPB... , uPC... , μPC... ,
uPD..., μPD...

Ref. No.	Part No.	Description			Remarks
*	A-6791-566-A	AJ-2A BOARD, COMPLETE **********************			
					(Ref.No.: 3,000 Series)
		< CAPACITOR >			
C806	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
		< PIN JACK >			
CJ801	1-774-509-11	JACK, PIN 3P (LINE-2 IN)			
		< CONNECTOR >			
CN801	1-506-484-11	PIN, CONNECTOR 5P			
		< DIODE >			
D801	8-719-421-59	DIODE MA3075WA-(TX)			
D802	8-719-421-59	DIODE MA3075WA-(TX)			
D803	8-719-422-37	DIODE MA8051			
D804	8-719-421-59	DIODE MA3075WA-(TX)			
		< RESISTOR >			
R801	1-216-295-00	METAL CHIP	0	5%	1/10W
R802	1-216-295-00	METAL CHIP	0	5%	1/10W
R803	1-216-022-00	METAL CHIP	75	5%	1/10W
*	A-6791-571-A	AN-16A BOARD, COMPLETE ***********************			
					(Ref.No.: 3,000 Series)
		< CAPACITOR >			
C201	1-163-136-00	CERAMIC CHIP	620PF	1%	50V
		< CONNECTOR >			
CN201	1-506-468-11	PIN, CONNECTOR 3P			
		< RESISTOR >			
R201	1-216-295-00	METAL CHIP	0	5%	1/10W
R202	1-216-295-00	METAL CHIP	0	5%	1/10W
*	A-6791-569-A	AN-17A BOARD, COMPLETE ***********************			
					(Ref.No.: 3,000 Series)
		< CAPACITOR >			
C101	1-125-830-11	CERAMIC CHIP	680PF	1%	50V
C102	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
		< CONNECTOR >			
CN101	1-506-482-11	PIN, CONNECTOR 3P			
*	A-6791-567-A	DM-81A BOARD, COMPLETE ***********************			
					(Ref.No.: 2,000 Series)
		< CONNECTOR >			
CN440	1-770-031-11	CONNECTOR, BOARD TO BOARD 7P			
CN441	1-770-514-41	CONNECTOR, FFC/FPC 5P			
		< DIODE >			
D440	8-719-056-06	DIODE SLR-342DCT31			
		< TRANSISTOR >			
Q440	8-729-424-08	TRANSISTOR UN2111			
		< RESISTOR >			
R441	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R442	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R443	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R444	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R445	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R446	1-216-029-00	METAL CHIP	150	5%	1/10W
		< SWITCH >			
S441	1-762-196-21	SWITCH, TACT (EJECT)			
S442	1-762-196-21	SWITCH, TACT (REC)			
S443	1-762-196-21	SWITCH, TACT (JOG)			
S444	1-762-196-21	SWITCH, TACT (PAUSE)			
*	A-6791-568-A	FR-139A BOARD, COMPLETE ************************			
					(Ref.No.: 2,000 Series)
		< BUZZER >			
BZ460	1-529-104-11	BUZZER, PIEZOELECTRIC			
		< CAPACITOR >			
C460	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C461	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C462	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C463	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C464	1-164-232-11	CERAMIC CHIP	0.01uF		50V

Ref. No.	Part No.	Description			Remarks
C465	1-126-916-11	ELECT	1000uF	20%	6.3V
C466	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C467	1-126-935-11	ELECT	470uF	20%	6.3V
C468	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C469	1-104-905-11	CAPACITOR	0.22F		5.5V
C471	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C472	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C473	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C474	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C475	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C476	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C477	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C478	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C479	1-126-096-11	ELECT	10uF	20%	35V
		< CONNECTOR >			
CN460	1-695-392-31	PIN, CONNECTOR (PC BOARD) 31P			
* CN461	1-691-406-11	CONNECTOR, BOARD TO BOARD 7P			
CN464	1-695-368-31	PIN, CONNECTOR (PC BOARD) 7P			
		< DIODE >			
D420	8-719-110-03	DIODE RD7.5ES-B2			
D460	8-719-056-07	DIODE SLR-342MCT31			
D462	8-719-200-82	DIODE 11ES2			
D463	8-719-200-82	DIODE 11ES2			
D464	8-719-056-06	DIODE SLR-342DCT31			
		< IC >			
IC460	8-752-891-11	IC CXP82960-054Q			
IC462	8-759-432-34	IC ST24W16FM6TR			
IC462	8-759-454-79	IC 24LC16BT/SN			
IC463	8-759-248-87	IC MM1256XF-BE			
IC464	8-742-012-11	HYB IC SBX1976-51			
		< JUMPER RESISTOR >			
JR401	1-216-296-00	METAL CHIP	0	5%	1/8W
JR402	1-216-295-00	METAL CHIP	0	5%	1/10W
JR404	1-216-295-00	METAL CHIP	0	5%	1/10W
JR405	1-216-296-00	METAL CHIP	0	5%	1/8W
JR406	1-216-295-00	METAL CHIP	0	5%	1/10W
JR407	1-216-295-00	METAL CHIP	0	5%	1/10W
JR408	1-216-296-00	METAL CHIP	0	5%	1/8W
JR409	1-216-296-00	METAL CHIP	0	5%	1/8W
JR410	1-216-296-00	METAL CHIP	0	5%	1/8W
JR411	1-216-296-00	METAL CHIP	0	5%	1/8W
JR412	1-216-296-00	METAL CHIP	0	5%	1/8W
JR413	1-216-296-00	METAL CHIP	0	5%	1/8W
JR414	1-216-295-00	METAL CHIP	0	5%	1/10W
JR415	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L181	1-410-509-11	INDUCTOR	10uH		
		< FLUORESCENT INDICATOR >			
ND420	1-517-733-11	TUBE, FLUORESCENT INDICATION			
		< TRANSISTOR >			
Q460	8-729-421-22	TRANSISTOR UN2211			
Q461	8-729-421-22	TRANSISTOR UN2211			

Ref. No.	Part No.	Description			Remarks
		< RESISTOR >			
R404	1-216-089-00	METAL CHIP	47K	5%	1/10W
R405	1-216-075-00	METAL CHIP	12K	5%	1/10W
R406	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R407	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R408	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R409	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R410	1-216-075-00	METAL CHIP	12K	5%	1/10W
R411	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R412	1-216-073-00	METAL CHIP	10K	5%	1/10W
R413	1-216-073-00	METAL CHIP	10K	5%	1/10W
R415	1-216-073-00	METAL CHIP	10K	5%	1/10W
R416	1-216-073-00	METAL CHIP	10K	5%	1/10W
R417	1-216-073-00	METAL CHIP	10K	5%	1/10W
R420	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R460	1-216-029-00	METAL CHIP	150	5%	1/10W
R461	1-216-089-00	METAL CHIP	47K	5%	1/10W
R462	1-216-049-00	METAL CHIP	1K	5%	1/10W
R463	1-216-089-00	METAL CHIP	47K	5%	1/10W
R464	1-216-295-00	METAL CHIP	0	5%	1/10W
R465	1-216-295-00	METAL CHIP	0	5%	1/10W
R466	1-216-073-00	METAL CHIP	10K	5%	1/10W
R467	1-216-073-00	METAL CHIP	10K	5%	1/10W
R468	1-216-113-00	METAL CHIP	470K	5%	1/10W
R469	1-216-073-00	METAL CHIP	10K	5%	1/10W
R470	1-216-073-00	METAL CHIP	10K	5%	1/10W
R471	1-216-025-91	RES,CHIP	100	5%	1/10W
R472	1-216-025-91	RES,CHIP	100	5%	1/10W
R474	1-216-113-00	METAL CHIP	470K	5%	1/10W
R475	1-216-295-00	METAL CHIP	0	5%	1/10W
R476	1-216-295-00	METAL CHIP	0	5%	1/10W
R477	1-216-095-00	METAL CHIP	82K	5%	1/10W
R478	1-216-113-00	METAL CHIP	470K	5%	1/10W
R479	1-216-049-00	METAL CHIP	1K	5%	1/10W
R480	1-216-049-00	METAL CHIP	1K	5%	1/10W
R481	1-216-049-00	METAL CHIP	1K	5%	1/10W
R482	1-216-049-00	METAL CHIP	1K	5%	1/10W
R483	1-216-073-00	METAL CHIP	10K	5%	1/10W
R484	1-216-073-00	METAL CHIP	10K	5%	1/10W
R485	1-216-113-00	METAL CHIP	470K	5%	1/10W
R486	1-216-081-00	METAL CHIP	22K	5%	1/10W
R487	1-216-029-00	METAL CHIP	150	5%	1/10W
R488	1-216-025-91	RES,CHIP	100	5%	1/10W
R490	1-216-025-91	RES,CHIP	100	5%	1/10W
R492	1-216-295-00	METAL CHIP	0	5%	1/10W
R493	1-216-295-00	METAL CHIP	0	5%	1/10W
		< SWITCH >			
S402	1-762-196-21	SWITCH, TACT (POWER)			
S403	1-762-196-21	SWITCH, TACT (COMMAND MODE)			
S404	1-762-196-21	SWITCH, TACT (SMARTFILE)			
S405	1-762-196-21	SWITCH, TACT (EASY SET UP)			
S406	1-762-196-21	SWITCH, TACT (CURSOR)			
S407	1-762-196-21	SWITCH, TACT (OK)			
S408	1-762-196-21	SWITCH, TACT (INPUT SELECT)			
S409	1-762-196-21	SWITCH, TACT (CHANNEL: -)			
S410	1-762-196-21	SWITCH, TACT (CHANNEL: +)			
S411	1-762-196-21	SWITCH, TACT (REW)			
S412	1-762-196-21	SWITCH, TACT (FF)			

Ref. No.	Part No.	Description			Remarks
		< VIBRATOR >			
X460	1-760-494-11	VIBRATOR, CRYSTAL 16MHz			
X461	1-579-463-11	VIBRATOR, CRYSTAL 32.768kHz			

*	A-6791-570-A	MA-335A BOARD, COMPLETE			
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		(Ref.No.: 1,000 Series)			
*	3-960-273-01	SPACER, TOP END			
*	3-960-274-01	SPACER, LED			
		< CAPACITOR >			
C101	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C102	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C103	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C104	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C105	1-128-057-11	ELECT	330uF	20%	6.3V
C106	1-124-589-11	ELECT	47uF	20%	16V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C118	1-137-441-11	FILM	0.027uF	5%	50V
C119	1-126-157-11	ELECT	10uF	20%	16V
C120	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C121	1-124-463-00	ELECT	0.1uF	20%	50V
C122	1-126-154-11	ELECT	47uF	20%	6.3V
C123	1-130-489-00	MYLAR	0.033uF	5%	50V
C140	1-126-933-11	ELECT	100uF	20%	16V
C142	1-126-933-11	ELECT	100uF	20%	16V
C143	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C144	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C145	1-126-967-11	ELECT	47uF	20%	16V
C146	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C147	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C149	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C150	1-126-967-11	ELECT	47uF	20%	16V
C151	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C152	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C153	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C160	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C161	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C162	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C163	1-126-154-11	ELECT	47uF	20%	6.3V
C164	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C165	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C166	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C172	1-124-584-00	ELECT	100uF	20%	10V
C201	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C202	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C204	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C205	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C206	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C207	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C208	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C209	1-124-248-00	ELECT	22uF	20%	35V
C210	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C214	1-163-124-00	CERAMIC CHIP	200PF	5%	50V
C217	1-109-982-11	CERAMIC CHIP	1uF	10%	10V

Ref. No.	Part No.	Description			Remarks
C219	1-164-159-21	CERAMIC	0.1uF		50V
C220	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C222	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C223	1-124-589-11	ELECT	47uF	20%	16V
C226	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C228	1-124-261-00	ELECT	10uF	20%	50V
C229	1-164-159-21	CERAMIC	0.1uF		50V
C230	1-124-589-11	ELECT	47uF	20%	16V
C231	1-124-261-00	ELECT	10uF	20%	50V
C232	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C233	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C234	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C235	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C236	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C237	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C238	1-164-159-21	CERAMIC	0.1uF		50V
C240	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C241	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C242	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C243	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C245	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C246	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C247	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C248	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C250	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C251	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C252	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C253	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C254	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C255	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C256	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C257	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C260	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C261	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C264	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C265	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C266	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C267	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C268	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C269	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C270	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C271	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C272	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C273	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C274	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C276	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C277	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C278	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C279	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C280	1-124-584-00	ELECT	100uF	20%	10V
C281	1-164-346-11	CERAMIC CHIP	1uF		16V
C282	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C283	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C284	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C285	1-162-306-11	CERAMIC	0.01uF	30%	16V
C286	1-124-584-00	ELECT	100uF	20%	10V
C287	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C288	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C289	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C301	1-164-159-21	CERAMIC	0.1uF		50V

Ref. No.	Part No.	Description			Remarks
C305	1-126-160-11	ELECT	1uF	20%	50V
C306	1-126-160-11	ELECT	1uF	20%	50V
C307	1-126-964-11	ELECT	10uF	20%	50V
C308	1-126-967-11	ELECT	47uF	20%	16V
C309	1-126-963-11	ELECT	4.7uF	20%	50V
C310	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C311	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C312	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C313	1-124-261-00	ELECT	10uF	20%	50V
C314	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C315	1-126-160-11	ELECT	1uF	20%	50V
C317	1-126-163-11	ELECT	4.7uF	20%	50V
C318	1-126-967-11	ELECT	47uF	20%	16V
C331	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C332	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C333	1-124-589-11	ELECT	47uF	20%	16V
C334	1-137-374-11	FILM	0.047uF	5%	50V
C340	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C341	1-124-589-11	ELECT	47uF	20%	16V
C342	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C346	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C350	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C352	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C353	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C357	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C358	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C359	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C361	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C362	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C363	1-126-960-11	ELECT	1uF	20%	50V
C364	1-126-960-11	ELECT	1uF	20%	50V
C365	1-126-960-11	ELECT	1uF	20%	50V
C366	1-126-960-11	ELECT	1uF	20%	50V
C369	1-126-964-11	ELECT	10uF	20%	50V
C370	1-126-964-11	ELECT	10uF	20%	50V
C371	1-126-964-11	ELECT	10uF	20%	50V
C372	1-126-964-11	ELECT	10uF	20%	50V
C373	1-126-964-11	ELECT	10uF	20%	50V
C374	1-126-960-11	ELECT	1uF	20%	50V
C375	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C377	1-126-967-11	ELECT	47uF	20%	16V
C378	1-126-964-11	ELECT	10uF	20%	50V
C379	1-126-961-11	ELECT	2.2uF	20%	50V
C380	1-126-964-11	ELECT	10uF	20%	50V
C381	1-126-967-11	ELECT	47uF	20%	16V
C383	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C384	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C385	1-126-967-11	ELECT	47uF	20%	16V
C386	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C391	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C398	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C399	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C501	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C502	1-124-589-11	ELECT	47uF	20%	16V
C503	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C504	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C505	1-126-157-11	ELECT	10uF	20%	16V
C506	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C507	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C508	1-163-237-11	CERAMIC CHIP	27PF	5%	50V

Ref. No.	Part No.	Description			Remarks
C509	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C511	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C512	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C513	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C514	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C515	1-124-589-11	ELECT	47uF	20%	16V
C516	1-126-160-11	ELECT	1uF	20%	50V
C517	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C518	1-124-257-00	ELECT	2.2uF	20%	50V
C519	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C520	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C521	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C522	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C523	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C560	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C561	1-126-935-11	ELECT	470uF	20%	6.3V
C563	1-124-589-11	ELECT	47uF	20%	16V
C564	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C621	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C622	1-126-965-11	ELECT	22uF	20%	50V
C623	1-124-589-11	ELECT	47uF	20%	16V
C624	1-124-589-11	ELECT	47uF	20%	16V
C625	1-126-967-11	ELECT	47uF	20%	16V
C626	1-128-131-11	ELECT	22uF	20%	50V
C627	1-128-131-11	ELECT	22uF	20%	50V
C628	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C629	1-126-966-11	ELECT	33uF	20%	16V
C701	1-126-967-11	ELECT	47uF	20%	16V
C704	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C706	1-126-963-11	ELECT	4.7uF	20%	50V
C707	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C709	1-126-933-11	ELECT	100uF	20%	16V
C710	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C712	1-126-933-11	ELECT	100uF	20%	16V
C735	1-126-964-11	ELECT	10uF	20%	50V
C736	1-126-967-11	ELECT	47uF	20%	16V
C801	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C802	1-163-263-11	CERAMIC CHIP	330PF	5%	50V
C803	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C804	1-163-091-00	CERAMIC CHIP	8PF		50V
C805	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C806	1-163-087-00	CERAMIC CHIP	4PF		50V
C807	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C808	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C809	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C810	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C811	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C812	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C813	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C814	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C815	1-124-589-11	ELECT	47uF	20%	16V
C816	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C817	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C851	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C852	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C853	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C854	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C855	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C859	1-124-589-11	ELECT	47uF	20%	16V
C871	1-124-589-11	ELECT	47uF	20%	16V

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Ref. No.	Part No.	Description			Remarks
C872	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C873	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C874	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C875	1-164-346-11	CERAMIC CHIP	1uF		16V
C876	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C878	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C880	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C881	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C980	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C981	1-126-967-11	ELECT	47uF	20%	16V
C982	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C983	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C984	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C985	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C986	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< PIN JACK >			
CJ570	1-779-011-11	JACK, PIN 6P (LINE-1 IN/LINE OUT)			
		< CONNECTOR >			
CN101	1-779-724-11	CONNECTOR, BOARD TO BOARD 5P			
CN102	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P			
* CN103	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P			
CN162	1-568-845-11	PIN, CONNECTOR (PC BOARD) 31P			
CN163	1-506-469-11	PIN, CONNECTOR 4P			
CN165	1-506-470-11	PIN, CONNECTOR 5P			
CN260	1-766-986-11	CONNECTOR, FFC/FPC 13P			
* CN261	1-560-892-00	PIN, CONNECTOR 4P			
CN301	1-506-471-11	PIN, CONNECTOR 6P			
CN302	1-506-468-11	PIN, CONNECTOR 3P			
* CN341	1-560-891-00	PIN, CONNECTOR 3P			
CN423	1-506-470-11	PIN, CONNECTOR 5P			
CN603	1-569-337-11	CONNECTOR, BOARD TO BOARD 11P			
		< JACK >			
CNJ980	1-779-013-11	JACK, MINIATURE (CONTROL S IN)			
CNJ981	1-784-598-11	JACK (CONTROL S OUT)			
		< DIODE >			
D103	8-719-048-26	DIODE GL528V1			
D107	8-719-911-19	DIODE 1SS119			
D109	8-719-200-82	DIODE 11ES2			
D161	8-719-200-82	DIODE 11ES2			
D370	8-719-110-08	DIODE RD8.2ES-B2			
D379	8-719-911-19	DIODE 1SS119			
D502	8-719-911-19	DIODE 1SS119			
D503	8-719-911-19	DIODE 1SS119			
D504	8-719-911-19	DIODE 1SS119			
D560	8-719-109-74	DIODE RD4.3ES-B1			
D561	8-719-109-74	DIODE RD4.3ES-B1			
D611	8-719-911-19	DIODE 1SS119			
D612	8-719-109-85	DIODE RD5.1ES-B2			
D614	8-719-911-19	DIODE 1SS119			
D702	8-719-150-92	DIODE RD33ES-T1B			
D801	8-719-971-05	DIODE HSM123			
D802	8-719-911-19	DIODE 1SS119			
D980	8-719-110-08	DIODE RD8.2ES-B2			
D981	8-719-110-08	DIODE RD8.2ES-B2			
D982	8-719-911-19	DIODE 1SS119			

Ref. No.	Part No.	Description			Remarks
D983	8-719-110-08	DIODE RD8.2ES-B2			
D984	8-719-110-08	DIODE RD8.2ES-B2			
		< IC >			
IC100	8-759-702-02	IC NJM062M			
IC101	8-759-481-46	IC LB1943			
IC140	8-759-100-93	IC uPC393G2			
IC141	8-759-438-83	IC BA6305F-E2			
IC161	8-752-896-78	IC CXP87852-046Q			
IC201	8-759-488-74	IC LA71534M-MPB			
IC202	8-759-439-51	IC LC89978M-TE-L			
IC260	8-759-352-17	IC HA118195NT			
IC301	8-759-499-30	IC BA7755AF-E2			
IC340	8-759-486-92	IC LA7256			
IC360	8-759-486-64	IC TDA9615H/N1,557			
IC500	8-759-529-44	IC MB90089PF-G-209-BND-ER			
IC501	8-759-164-09	IC LA7218M-TE-R			
IC601	8-759-438-18	IC PQ12RD08			
IC733	8-742-037-00	HY B IC SBX1837-51			
IC871	8-759-430-84	IC MC68HC05CCVFB-LSC86145FB			
IC980	8-759-356-27	IC NJM2129M-TE2			
		< JUMPER RESISTOR >			
JR001	1-216-295-00	METAL CHIP	0	5%	1/10W
JR002	1-216-296-00	METAL CHIP	0	5%	1/8W
JR004	1-216-295-00	METAL CHIP	0	5%	1/10W
JR005	1-216-296-00	METAL CHIP	0	5%	1/8W
JR007	1-216-296-00	METAL CHIP	0	5%	1/8W
JR008	1-216-296-00	METAL CHIP	0	5%	1/8W
JR009	1-216-296-00	METAL CHIP	0	5%	1/8W
JR010	1-216-296-00	METAL CHIP	0	5%	1/8W
JR011	1-216-296-00	METAL CHIP	0	5%	1/8W
JR012	1-216-296-00	METAL CHIP	0	5%	1/8W
JR013	1-216-295-00	METAL CHIP	0	5%	1/10W
JR014	1-216-296-00	METAL CHIP	0	5%	1/8W
JR015	1-216-296-00	METAL CHIP	0	5%	1/8W
JR016	1-216-295-00	METAL CHIP	0	5%	1/10W
JR017	1-216-296-00	METAL CHIP	0	5%	1/8W
JR018	1-216-296-00	METAL CHIP	0	5%	1/8W
JR019	1-216-295-00	METAL CHIP	0	5%	1/10W
JR020	1-216-296-00	METAL CHIP	0	5%	1/8W
JR021	1-216-295-00	METAL CHIP	0	5%	1/10W
JR022	1-216-296-00	METAL CHIP	0	5%	1/8W
JR023	1-216-296-00	METAL CHIP	0	5%	1/8W
JR024	1-216-296-00	METAL CHIP	0	5%	1/8W
JR025	1-216-295-00	METAL CHIP	0	5%	1/10W
JR026	1-216-295-00	METAL CHIP	0	5%	1/10W
JR027	1-216-295-00	METAL CHIP	0	5%	1/10W
JR028	1-216-295-00	METAL CHIP	0	5%	1/10W
JR029	1-216-295-00	METAL CHIP	0	5%	1/10W
JR030	1-216-296-00	METAL CHIP	0	5%	1/8W
JR031	1-216-296-00	METAL CHIP	0	5%	1/8W
JR032	1-216-296-00	METAL CHIP	0	5%	1/8W
JR033	1-216-295-00	METAL CHIP	0	5%	1/10W
JR034	1-216-296-00	METAL CHIP	0	5%	1/8W
JR035	1-216-295-00	METAL CHIP	0	5%	1/10W
JR036	1-216-296-00	METAL CHIP	0	5%	1/8W
JR037	1-216-296-00	METAL CHIP	0	5%	1/8W

Ref. No.	Part No.	Description			Remarks
JR038	1-216-295-00	METAL CHIP	0	5%	1/10W
JR039	1-216-296-00	METAL CHIP	0	5%	1/8W
JR040	1-216-296-00	METAL CHIP	0	5%	1/8W
JR041	1-216-296-00	METAL CHIP	0	5%	1/8W
JR043	1-216-296-00	METAL CHIP	0	5%	1/8W
JR044	1-216-296-00	METAL CHIP	0	5%	1/8W
JR045	1-216-296-00	METAL CHIP	0	5%	1/8W
JR046	1-216-295-00	METAL CHIP	0	5%	1/10W
JR047	1-216-296-00	METAL CHIP	0	5%	1/8W
JR048	1-216-296-00	METAL CHIP	0	5%	1/8W
JR049	1-216-296-00	METAL CHIP	0	5%	1/8W
JR050	1-216-295-00	METAL CHIP	0	5%	1/10W
		< JUMPER RESISTOR >			
JS609	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L101	1-414-936-21	INDUCTOR	22uH		
L140	1-414-189-31	INDUCTOR	100uH		
L141	1-414-189-31	INDUCTOR	100uH		
L160	1-414-934-21	INDUCTOR	10uH		
L201	1-408-405-00	INDUCTOR	4.7uH		
L204	1-414-940-21	INDUCTOR	100uH		
L207	1-414-931-21	INDUCTOR	3.3uH		
L262	1-414-940-21	INDUCTOR	100uH		
L263	1-414-940-21	INDUCTOR	100uH		
L331	1-414-940-21	INDUCTOR	100uH		
L341	1-414-940-21	INDUCTOR	100uH		
L501	1-414-936-21	INDUCTOR	22uH		
L502	1-414-940-21	INDUCTOR	100uH		
L503	1-414-940-21	INDUCTOR	100uH		
L560	1-414-940-21	INDUCTOR	100uH		
L604	1-410-519-11	INDUCTOR	68uH		
L605	1-414-930-21	INDUCTOR	2.2uH		
L606	1-414-934-21	INDUCTOR	10uH		
L607	1-414-930-21	INDUCTOR	2.2uH		
L703	1-414-930-21	INDUCTOR	2.2uH		
L704	1-414-938-21	INDUCTOR	47uH		
L731	1-414-938-21	INDUCTOR	47uH		
L801	1-410-524-41	INDUCTOR	180uH		
L803	1-414-946-21	INDUCTOR	39uH		
L804	1-414-946-21	INDUCTOR	39uH		
L805	1-414-939-21	INDUCTOR	68uH		
L808	1-414-932-21	INDUCTOR	4.7uH		
L871	1-414-934-21	INDUCTOR	10uH		
		< PHOTO INTERRUPTER >			
PH101	8-749-013-23	PHOTO INTERRUPTER GP3S120			
PH102	8-749-013-23	PHOTO INTERRUPTER GP3S120			
		< IC LINK >			
⚠PS101	1-533-586-11	LINK, IC	315mA		
⚠PS600	1-533-592-11	LINK, IC	1.6A		

Ref. No.	Part No.	Description			Remarks
		< TRANSISTOR >			
Q101	8-729-043-84	TRANSISTOR	PT380F3		
Q102	8-729-043-84	TRANSISTOR	PT380F3		
Q103	8-729-281-53	TRANSISTOR	2SC1815-GR		
Q140	8-729-901-06	TRANSISTOR	DTA144EK		
Q201	8-729-230-49	TRANSISTOR	2SC2712-G		
Q204	8-729-024-88	TRANSISTOR	MUN2212T1		
Q205	8-729-421-19	TRANSISTOR	UN2213		
Q208	8-729-230-49	TRANSISTOR	2SC2712-G		
Q209	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q210	8-729-230-49	TRANSISTOR	2SC2712-G		
Q211	8-729-230-49	TRANSISTOR	2SC2712-G		
Q214	8-729-421-19	TRANSISTOR	UN2213		
Q260	8-729-230-49	TRANSISTOR	2SC2712-G		
Q301	8-729-281-53	TRANSISTOR	2SC1815-GR		
Q331	8-729-802-91	TRANSISTOR	2SD879		
Q379	8-729-216-22	TRANSISTOR	2SA1162		
Q386	8-729-230-49	TRANSISTOR	2SC2712-G		
Q387	8-729-230-49	TRANSISTOR	2SC2712-G		
Q502	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q503	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q505	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q560	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q603	8-729-018-99	TRANSISTOR	2SD2394-F		
Q604	8-729-010-29	TRANSISTOR	MSD601-RST1		
Q605	8-729-140-93	TRANSISTOR	2SB733-34		
Q606	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q731	8-729-421-19	TRANSISTOR	UN2213		
Q801	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q802	8-729-230-49	TRANSISTOR	2SC2712-G		
Q803	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q804	8-729-230-49	TRANSISTOR	2SC2712-G		
Q805	8-729-900-51	TRANSISTOR	DTA114TK		
Q806	8-729-230-49	TRANSISTOR	2SC2712-G		
Q807	8-729-230-49	TRANSISTOR	2SC2712-G		
Q808	8-729-230-49	TRANSISTOR	2SC2712-G		
Q809	8-729-900-51	TRANSISTOR	DTA114TK		
Q810	8-729-230-49	TRANSISTOR	2SC2712-G		
Q851	8-729-230-49	TRANSISTOR	2SC2712-G		
Q852	8-729-230-49	TRANSISTOR	2SC2712-G		
Q853	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q854	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q855	8-729-230-49	TRANSISTOR	2SC2712-G		
Q856	8-729-230-49	TRANSISTOR	2SC2712-G		
Q857	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L		
Q871	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q872	8-729-010-29	TRANSISTOR	MSD601-RST1		
Q873	8-729-010-29	TRANSISTOR	MSD601-RST1		
Q874	8-729-424-08	TRANSISTOR	UN2111		
Q875	8-729-010-29	TRANSISTOR	MSD601-RST1		
		< RESISTOR >			
R101	1-249-413-11	CARBON	470	5%	1/4W F
R102	1-216-089-00	METAL CHIP	47K	5%	1/10W
R103	1-249-437-11	CARBON	47K	5%	1/4W
R104	1-216-085-00	METAL CHIP	33K	5%	1/10W
R105	1-216-085-00	METAL CHIP	33K	5%	1/10W

Note :	Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remarks
R106	1-249-400-11	CARBON	39	5%	1/4W F
R107	1-249-400-11	CARBON	39	5%	1/4W F
R108	1-249-421-11	CARBON	2.2K	5%	1/4W F
R109	1-216-041-00	METAL CHIP	470	5%	1/10W
R110	1-216-041-00	METAL CHIP	470	5%	1/10W
R111	1-216-041-00	METAL CHIP	470	5%	1/10W
R118	1-216-089-00	METAL CHIP	47K	5%	1/10W
R119	1-216-077-00	METAL CHIP	15K	5%	1/10W
R124	1-249-421-11	CARBON	2.2K	5%	1/4W F
R125	1-249-421-11	CARBON	2.2K	5%	1/4W F
R126	1-247-885-00	CARBON	180K	5%	1/4W
R127	1-249-429-11	CARBON	10K	5%	1/4W
R128	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R129	1-216-073-00	METAL CHIP	10K	5%	1/10W
R130	1-216-073-00	METAL CHIP	10K	5%	1/10W
R131	1-208-806-11	RES,CHIP	10K	0.50%	1/10W
R132	1-208-806-11	RES,CHIP	10K	0.50%	1/10W
R133	1-249-436-11	CARBON	39K	5%	1/4W
R134	1-216-089-00	METAL CHIP	47K	5%	1/10W
R135	1-216-089-00	METAL CHIP	47K	5%	1/10W
R136	1-216-089-00	METAL CHIP	47K	5%	1/10W
R137	1-216-089-00	METAL CHIP	47K	5%	1/10W
R140	1-208-830-11	RES,CHIP	100K	0.50%	1/10W
R141	1-208-830-11	RES,CHIP	100K	0.50%	1/10W
R143	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R144	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R145	1-208-830-11	RES,CHIP	100K	0.50%	1/10W
R146	1-208-830-11	RES,CHIP	100K	0.50%	1/10W
R148	1-249-414-11	CARBON	560	5%	1/4W F
R149	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R150	1-216-049-00	METAL CHIP	1K	5%	1/10W
R151	1-216-037-00	METAL CHIP	330	5%	1/10W
R152	1-216-117-00	METAL CHIP	680K	5%	1/10W
R153	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R154	1-216-111-00	METAL CHIP	390K	5%	1/10W
R155	1-216-105-91	RES,CHIP	220K	5%	1/10W
R160	1-216-077-00	METAL CHIP	15K	5%	1/10W
R161	1-216-073-00	METAL CHIP	10K	5%	1/10W
R162	1-216-089-00	METAL CHIP	47K	5%	1/10W
R163	1-216-073-00	METAL CHIP	10K	5%	1/10W
R164	1-216-073-00	METAL CHIP	10K	5%	1/10W
R165	1-216-295-00	METAL CHIP	0	5%	1/10W
R166	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R167	1-216-097-91	RES,CHIP	100K	5%	1/10W
R168	1-249-417-11	CARBON	1K	5%	1/4W F
R169	1-216-073-00	METAL CHIP	10K	5%	1/10W
R170	1-216-073-00	METAL CHIP	10K	5%	1/10W
R201	1-216-041-00	METAL CHIP	470	5%	1/10W
R202	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R203	1-216-049-00	METAL CHIP	1K	5%	1/10W
R204	1-249-413-11	CARBON	470	5%	1/4W F
R210	1-216-295-00	METAL CHIP	0	5%	1/10W
R212	1-216-073-00	METAL CHIP	10K	5%	1/10W
R213	1-249-429-11	CARBON	10K	5%	1/4W
R218	1-208-798-11	RES,CHIP	4.7K	0.50%	1/10W
R219	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R221	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R222	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R228	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R229	1-216-055-00	METAL CHIP	1.8K	5%	1/10W

Ref. No.	Part No.	Description			Remarks
R230	1-216-045-00	METAL CHIP	680	5%	1/10W
R231	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R232	1-249-420-11	CARBON	1.8K	5%	1/4W F
R234	1-216-049-00	METAL CHIP	1K	5%	1/10W
R235	1-216-295-00	METAL CHIP	0	5%	1/10W
R236	1-216-049-00	METAL CHIP	1K	5%	1/10W
R237	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R238	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R239	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R240	1-216-049-00	METAL CHIP	1K	5%	1/10W
R241	1-216-295-00	METAL CHIP	0	5%	1/10W
R247	1-216-041-00	METAL CHIP	470	5%	1/10W
R260	1-216-044-00	METAL CHIP	620	5%	1/10W
R261	1-216-044-00	METAL CHIP	620	5%	1/10W
R262	1-216-295-00	METAL CHIP	0	5%	1/10W
R263	1-216-295-00	METAL CHIP	0	5%	1/10W
R264	1-216-295-00	METAL CHIP	0	5%	1/10W
R265	1-216-295-00	METAL CHIP	0	5%	1/10W
R266	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R267	1-216-073-00	METAL CHIP	10K	5%	1/10W
R268	1-216-081-00	METAL CHIP	22K	5%	1/10W
R269	1-249-421-11	CARBON	2.2K	5%	1/4W F
R270	1-247-863-91	CARBON	22K	5%	1/4W
R271	1-216-049-00	METAL CHIP	1K	5%	1/10W
R272	1-216-077-00	METAL CHIP	15K	5%	1/10W
R273	1-216-077-00	METAL CHIP	15K	5%	1/10W
R274	1-216-073-00	METAL CHIP	10K	5%	1/10W
R275	1-216-073-00	METAL CHIP	10K	5%	1/10W
R276	1-216-049-00	METAL CHIP	1K	5%	1/10W
R301	1-216-093-00	METAL CHIP	68K	5%	1/10W
R302	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R306	1-216-073-00	METAL CHIP	10K	5%	1/10W
R307	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R309	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R310	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R311	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R312	1-216-079-00	METAL CHIP	18K	5%	1/10W
R313	1-216-109-00	METAL CHIP	330K	5%	1/10W
R314	1-216-035-00	METAL CHIP	270	5%	1/10W
R315	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R316	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R317	1-216-079-00	METAL CHIP	18K	5%	1/10W
R318	1-216-075-00	METAL CHIP	12K	5%	1/10W
R320	1-216-047-91	RES,CHIP	820	5%	1/10W
R331	1-217-671-11	METAL CHIP	1	5%	1/10W
R332	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R333	1-249-401-11	CARBON	47	5%	1/4W F
R334	1-216-031-00	METAL CHIP	180	5%	1/10W
R341	1-216-049-00	METAL CHIP	1K	5%	1/10W
R342	1-216-049-00	METAL CHIP	1K	5%	1/10W
R344	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R346	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R347	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R348	1-216-033-00	METAL CHIP	220	5%	1/10W
R368	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
R370	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R371	1-208-820-11	RES,CHIP	39K	0.50%	1/10W
R372	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R373	1-216-033-00	METAL CHIP	220	5%	1/10W
R374	1-216-033-00	METAL CHIP	220	5%	1/10W

Ref. No.	Part No.	Description			Remarks	
R378	1-249-434-11	CARBON	27K	5%	1/4W	
R379	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R380	1-216-025-91	RES,CHIP	100	5%	1/10W	
R381	1-216-025-91	RES,CHIP	100	5%	1/10W	
R382	1-216-295-00	METAL CHIP	0	5%	1/10W	
R383	1-216-295-00	METAL CHIP	0	5%	1/10W	
R384	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R385	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R386	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R387	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R389	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R391	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R392	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R393	1-216-295-00	METAL CHIP	0	5%	1/10W	
R501	1-216-295-00	METAL CHIP	0	5%	1/10W	
R502	1-216-033-00	METAL CHIP	220	5%	1/10W	
R505	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R506	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R507	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R508	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R510	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R514	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R515	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R517	1-216-063-91	RES,CHIP	3.9K	5%	1/10W	
R518	1-216-043-91	RES,CHIP	560	5%	1/10W	
R519	1-216-043-91	RES,CHIP	560	5%	1/10W	
R520	1-216-033-00	METAL CHIP	220	5%	1/10W	
R521	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R522	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R523	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R560	1-216-022-00	METAL CHIP	75	5%	1/10W	
R561	1-216-021-00	METAL CHIP	68	5%	1/10W	
R562	1-249-407-11	CARBON	150	5%	1/4W	F
R563	1-249-407-11	CARBON	150	5%	1/4W	F
R565	1-216-037-00	METAL CHIP	330	5%	1/10W	
R617	1-249-417-11	CARBON	1K	5%	1/4W	F
R621	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R622	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R623	1-247-843-11	CARBON	3.3K	5%	1/4W	
R624	1-216-430-11	METAL OXIDE	390	5%	1W	F
R625	1-249-429-11	CARBON	10K	5%	1/4W	
R626	1-249-417-11	CARBON	1K	5%	1/4W	F
R627	1-247-815-91	CARBON	220	5%	1/4W	
R628	1-247-815-91	CARBON	220	5%	1/4W	
R701	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R702	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
⚠R705	1-212-893-00	FUSIBLE	330	5%	1/4W	F
R706	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R709	1-216-295-00	METAL CHIP	0	5%	1/10W	
R710	1-216-295-00	METAL CHIP	0	5%	1/10W	
R711	1-216-295-00	METAL CHIP	0	5%	1/10W	
R712	1-216-295-00	METAL CHIP	0	5%	1/10W	
R731	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R732	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R733	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R735	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R736	1-216-295-00	METAL CHIP	0	5%	1/10W	
R737	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R738	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R739	1-249-429-11	CARBON	10K	5%	1/4W	

Ref. No.	Part No.	Description			Remarks	
R748	1-216-065-91	RES,CHIP	4.7K	5%	1/10W	
R749	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R801	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R802	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R803	1-216-039-00	METAL CHIP	390	5%	1/10W	
R804	1-216-039-00	METAL CHIP	390	5%	1/10W	
R805	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R806	1-216-043-91	RES,CHIP	560	5%	1/10W	
R807	1-216-039-00	METAL CHIP	390	5%	1/10W	
R808	1-216-033-00	METAL CHIP	220	5%	1/10W	
R809	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R810	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R811	1-216-033-00	METAL CHIP	220	5%	1/10W	
R812	1-216-043-91	RES,CHIP	560	5%	1/10W	
R813	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R814	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R815	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R816	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R817	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R818	1-216-039-00	METAL CHIP	390	5%	1/10W	
R819	1-216-045-00	METAL CHIP	680	5%	1/10W	
R820	1-216-039-00	METAL CHIP	390	5%	1/10W	
R821	1-216-045-00	METAL CHIP	680	5%	1/10W	
R822	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R823	1-216-041-00	METAL CHIP	470	5%	1/10W	
R824	1-216-047-91	RES,CHIP	820	5%	1/10W	
R825	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R826	1-216-025-91	RES,CHIP	100	5%	1/10W	
R827	1-216-045-00	METAL CHIP	680	5%	1/10W	
R828	1-216-043-91	RES,CHIP	560	5%	1/10W	
R838	1-249-410-11	CARBON	270	5%	1/4W	F
R844	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R851	1-208-820-11	RES,CHIP	39K	0.50%	1/10W	
R852	1-208-802-11	RES,CHIP	6.8K	0.50%	1/10W	
R853	1-208-792-11	RES,CHIP	2.7K	0.50%	1/10W	
R855	1-208-770-11	RES,CHIP	330	0.50%	1/10W	
R856	1-208-758-11	RES,CHIP	100	0.50%	1/10W	
R857	1-208-790-11	RES,CHIP	2.2K	0.50%	1/10W	
R858	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R859	1-208-800-11	RES,CHIP	5.6K	0.50%	1/10W	
R860	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R861	1-216-065-91	RES,CHIP	4.7K	5%	1/10W	
R862	1-208-806-11	RES,CHIP	10K	0.50%	1/10W	
R864	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R865	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R871	1-249-429-11	CARBON	10K	5%	1/4W	
R872	1-247-807-31	CARBON	100	5%	1/4W	
R873	1-247-807-31	CARBON	100	5%	1/4W	
R874	1-247-807-31	CARBON	100	5%	1/4W	
R875	1-247-807-31	CARBON	100	5%	1/4W	
R876	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R877	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R878	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R879	1-249-417-11	CARBON	1K	5%	1/4W	F
R880	1-249-429-11	CARBON	10K	5%	1/4W	

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	**Note :** Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MA-335 **NL-2**

Ref. No.	Part No.	Description			Remarks
R881	1-216-043-91	RES,CHIP	560	5%	1/10W
R882	1-216-049-00	METAL CHIP	1K	5%	1/10W
R883	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R884	1-216-047-91	RES,CHIP	820	5%	1/10W
R885	1-247-807-31	CARBON	100	5%	1/4W
R886	1-216-073-00	METAL CHIP	10K	5%	1/10W
R887	1-216-081-00	METAL CHIP	22K	5%	1/10W
R888	1-216-081-00	METAL CHIP	22K	5%	1/10W
R889	1-247-807-31	CARBON	100	5%	1/4W
R890	1-216-049-00	METAL CHIP	1K	5%	1/10W
R980	1-216-049-00	METAL CHIP	1K	5%	1/10W
R981	1-216-295-00	METAL CHIP	0	5%	1/10W

< VARIABLE RESISTOR >

Ref. No.	Part No.	Description
RV731	1-241-766-11	RES, ADJ, CERMET 47K

< SWITCH >

Ref. No.	Part No.	Description
S101	1-762-108-11	SWITCH, PUSH (1 KEY) (REC PROOF)
S102	1-771-155-11	SWITCH, ROTARY (MECHANISM MODE)
S701	1-571-588-11	SWITCH, SLIDE (RF UNIT CH3/CH4)

< TRANSFORMER >

Ref. No.	Part No.	Description
T331	1-431-097-11	TRANSFORMER, BIAS OSCILLATION

< TUNER >

Ref. No.	Part No.	Description
TU700	8-598-289-00	TUNER, FSS BTF-MA401

< VIBRATOR >

Ref. No.	Part No.	Description
X160	1-760-494-11	VIBRATOR, CRYSTAL 16MHz
X202	1-577-380-11	VIBRATOR, CRYSTAL 3.579545MHz
X500	1-577-381-11	VIBRATOR, CRYSTAL 14.31818MHz
X501	1-577-165-11	VIBLATOR, CERAMIC 503.5kHz
X871	1-577-133-21	VIBRATOR, CRYSTAL 8MHz

Ref. No.	Part No.	Description
*	A-6791-572-A	NL-2A BOARD, COMPLETE

****

(Ref.No.: 3,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description			Remarks
C002	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C006	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C007	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C008	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C009	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C010	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C011	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C012	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C013	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C015	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C016	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C017	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C018	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C020	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C021	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C022	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C023	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C024	1-124-234-00	ELECT	22uF	20%	16V
C026	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C027	1-124-589-11	ELECT	47uF	20%	16V
C029	1-124-234-00	ELECT	22uF	20%	16V
C030	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C032	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C034	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C035	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C036	1-124-234-00	ELECT	22uF	20%	16V
C037	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C038	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C039	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C041	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C045	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C046	1-124-234-00	ELECT	22uF	20%	16V
C047	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C048	1-124-234-00	ELECT	22uF	20%	16V

< CONNECTOR >

Ref. No.	Part No.	Description
CN001	1-506-468-11	PIN, CONNECTOR 3P
CN002	1-506-468-11	PIN, CONNECTOR 3P
CN003	1-506-470-11	PIN, CONNECTOR 5P
CN004	1-695-330-31	PIN, CONNECTOR (PC BOARD) 7P

< JACK >

Ref. No.	Part No.	Description
CNJ001	1-784-598-11	JACK (CPD IN)

< DIODE >

Ref. No.	Part No.	Description
D001	8-719-911-19	DIODE 1SS119
D002	8-719-911-19	DIODE 1SS119
D003	8-719-911-19	DIODE 1SS119
D004	8-719-911-19	DIODE 1SS119
D005	8-719-911-19	DIODE 1SS119
D007	8-719-110-08	DIODE RD8.2ES-B2
D008	8-719-911-19	DIODE 1SS119

< INDUCTOR CHIP >

Ref. No.	Part No.	Description
FB001	1-414-234-11	INDUCTOR CHIP 0UH
FB002	1-414-234-11	INDUCTOR CHIP 0UH
FB003	1-414-234-11	INDUCTOR CHIP 0UH
FB004	1-414-233-21	INDUCTOR CHIP 0UH
FB005	1-414-233-21	INDUCTOR CHIP 0UH
FB006	1-414-233-21	INDUCTOR CHIP 0UH
FB007	1-414-233-21	INDUCTOR CHIP 0UH
FB008	1-414-234-11	INDUCTOR CHIP 0UH
FB009	1-414-234-11	INDUCTOR CHIP 0UH
FB010	1-414-234-11	INDUCTOR CHIP 0UH
FB011	1-414-234-11	INDUCTOR CHIP 0UH
FB012	1-414-234-11	INDUCTOR CHIP 0UH
FB020	1-414-235-11	INDUCTOR CHIP 0UH
FB021	1-414-235-11	INDUCTOR CHIP 0UH
FB022	1-414-235-11	INDUCTOR CHIP 0UH
FB023	1-414-235-11	INDUCTOR CHIP 0UH
FB024	1-414-235-11	INDUCTOR CHIP 0UH

< IC >

Ref. No.	Part No.	Description
IC001	8-759-100-93	IC uPC393G2
IC002	8-759-531-73	IC CXD8753Q
IC003	8-752-896-31	IC CXP84632-030Q
IC004	8-759-518-23	IC X24C04S8

Ref. No.	Part No.	Description			Remarks
		< COIL >			
L002	1-414-934-21	INDUCTOR	10uH		
L003	1-414-934-21	INDUCTOR	10uH		
L004	1-414-938-21	INDUCTOR	47uH		
L006	1-414-934-21	INDUCTOR	10uH		
L007	1-414-934-21	INDUCTOR	10uH		
L008	1-414-940-21	INDUCTOR	100uH		
L009	1-414-936-21	INDUCTOR	22uH		
L010	1-414-936-21	INDUCTOR	22uH		
		< IC LINK >			
⚠PS001	1-533-901-11	LINK, IC	125mA		
⚠PS002	1-533-587-11	LINK, IC	400mA		
		< TRANSISTOR >			
Q001	8-729-044-60	TRANSISTOR	2SC3383-T-AA		
Q002	8-729-044-60	TRANSISTOR	2SC3383-T-AA		
Q003	8-729-421-19	TRANSISTOR	UN2213		
Q004	8-729-010-25	TRANSISTOR	MSD601-RT1		
Q005	8-729-010-25	TRANSISTOR	MSD601-RT1		
Q006	8-729-010-25	TRANSISTOR	MSD601-RT1		
Q007	8-729-010-25	TRANSISTOR	MSD601-RT1		
Q008	8-729-044-60	TRANSISTOR	2SC3383-T-AA		
Q009	8-729-421-19	TRANSISTOR	UN2213		
Q010	8-729-421-19	TRANSISTOR	UN2213		
Q011	8-729-044-60	TRANSISTOR	2SC3383-T-AA		
Q012	8-729-421-19	TRANSISTOR	UN2213		
Q015	8-729-421-19	TRANSISTOR	UN2213		
Q016	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q017	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q018	8-729-010-05	TRANSISTOR	MSB709-RT1		
Q019	8-729-010-05	TRANSISTOR	MSB709-RT1		
		< RESISTOR >			
R002	1-249-402-11	CARBON	56	5%	1/4W F
R004	1-216-049-00	METAL CHIP	1K	5%	1/10W
R005	1-216-049-00	METAL CHIP	1K	5%	1/10W
R007	1-249-398-11	CARBON	27	5%	1/4W F
R008	1-216-049-00	METAL CHIP	1K	5%	1/10W
R009	1-216-295-00	METAL CHIP	0	5%	1/10W
R010	1-216-049-00	METAL CHIP	1K	5%	1/10W
R011	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R012	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R013	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R014	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R015	1-216-025-91	RES,CHIP	100	5%	1/10W
R016	1-216-089-00	METAL CHIP	47K	5%	1/10W
R017	1-216-081-00	METAL CHIP	22K	5%	1/10W
R018	1-216-025-91	RES,CHIP	100	5%	1/10W
R019	1-216-089-00	METAL CHIP	47K	5%	1/10W
R020	1-216-081-00	METAL CHIP	22K	5%	1/10W
R022	1-216-049-00	METAL CHIP	1K	5%	1/10W
R023	1-216-017-91	RES,CHIP	47	5%	1/10W
R024	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R025	1-216-049-00	METAL CHIP	1K	5%	1/10W
R027	1-249-402-11	CARBON	56	5%	1/4W F
R030	1-216-017-91	RES,CHIP	47	5%	1/10W
R031	1-216-073-00	METAL CHIP	10K	5%	1/10W
R032	1-216-065-91	RES,CHIP	4.7K	5%	1/10W

Ref. No.	Part No.	Description			Remarks
R033	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R035	1-249-398-11	CARBON	27	5%	1/4W F
R036	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R037	1-216-295-00	METAL CHIP	0	5%	1/10W
R038	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R039	1-216-065-91	RES,CHIP	4.7K	5%	1/10W
R040	1-216-121-91	RES,CHIP	1M	5%	1/10W
R041	1-216-073-00	METAL CHIP	10K	5%	1/10W
R042	1-216-073-00	METAL CHIP	10K	5%	1/10W
R046	1-216-295-00	METAL CHIP	0	5%	1/10W
R048	1-216-089-00	METAL CHIP	47K	5%	1/10W
R051	1-216-045-00	METAL CHIP	680	5%	1/10W
R053	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R054	1-216-025-91	RES,CHIP	100	5%	1/10W
R057	1-216-025-91	RES,CHIP	100	5%	1/10W
R058	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R060	1-216-045-00	METAL CHIP	680	5%	1/10W
R061	1-216-045-00	METAL CHIP	680	5%	1/10W
R063	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R064	1-216-025-91	RES,CHIP	100	5%	1/10W
R067	1-216-025-91	RES,CHIP	100	5%	1/10W
R068	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R070	1-216-045-00	METAL CHIP	680	5%	1/10W
R071	1-216-041-00	METAL CHIP	470	5%	1/10W
R072	1-216-041-00	METAL CHIP	470	5%	1/10W
R073	1-216-041-00	METAL CHIP	470	5%	1/10W
R074	1-216-041-00	METAL CHIP	470	5%	1/10W
R081	1-216-089-00	METAL CHIP	47K	5%	1/10W
R082	1-216-089-00	METAL CHIP	47K	5%	1/10W
R083	1-216-043-91	RES,CHIP	560	5%	1/10W
		< VIBRATOR >			
X001	1-767-914-21	VIBRATOR, CRYSTAL 13.56MHz			
X002	1-760-995-21	VIBRATOR, CRYSTAL 16MHz			

⚠	1-468-308-11	POWER BLOCK SR821
		******************

(Ref. No.: 9,000 Series)

Ref. No.	Part No.	Description		Remarks
		< CAPACITOR >		
⚠C101	1-104-705-51	FILM	0.1uF	250V
⚠C102	1-104-705-51	FILM	0.1uF	250V
C106	1-119-882-41	ELECT	120uF	200V
C107	1-126-963-11	ELECT	4.7uF	50V
C110	1-130-491-51	FILM	0.047uF	50V
C111	1-130-491-51	FILM	0.047uF	50V
C201	1-126-967-11	ELECT	47uF	50V
C202	1-126-183-11	ELECT	1000uF	16V
C203	1-126-934-11	ELECT	220uF	16V
C204	1-111-044-11	ELECT	2200uF	16V
C205	1-126-925-11	ELECT	470uF	10V
C206	1-126-967-11	ELECT	47uF	50V
C207	1-126-925-11	ELECT	470uF	10V
C208	1-126-960-11	ELECT	1uF	50V

Note :	Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

POWER BLOCK SR821

Ref. No.	Part No.	Description	Remarks
		< DIODE >	
D103	8-719-920-32	DIODE ERA15-02	
D104	8-719-109-61	DIODE RD3.0ES	
D105	8-719-911-19	DIODE 1SS119	
D106	8-719-904-05	DIODE 1N4005	
D107	8-719-904-05	DIODE 1N4005	
D108	8-719-904-05	DIODE 1N4005	
D109	8-719-904-05	DIODE 1N4005	
D110	8-719-904-05	DIODE 1N4005	
D201	8-719-061-02	DIODE PR1003	
D202	8-719-510-73	DIODE S3L20U	
D204	8-719-027-20	DIODE D3S4M	
D205	8-719-058-08	DIODE RD51F	
D206	8-719-061-02	DIODE PR1003	
D207	8-719-061-02	DIODE PR1003	
		< FUSE >	
⚠F101	1-533-296-11	FUSE 2A	125V
		< FERRITE BEAD >	
FB1	9-902-053-01	FERRITE BEAD	
		< IC >	
⚠IC201	8-759-420-19	IC AN1431T	
		< PHOTOCOUPLER >	
⚠PC101	8-719-018-29	PHOTOCOUPLER ON3131	
		< TRANSISTOR >	
Q101	8-729-904-98	TRANSISTOR 2SC4054	
Q102	8-729-012-31	TRANSISTOR 2SC4040	
		< RESISTOR >	
⚠R101	1-219-779-51	CARBON 6.8M 10%	1/2W
		MISCELLANEOUS	
		*************	
	1-666-524-11	PWB, CA-55	
	1-766-723-21	CONNECTOR, BOARD TO BOARD 3P	
⚠ 9	1-783-605-11	CORD, POWER	
11	1-762-844-21	SWITCH, ROTARY	
14	1-783-546-11	CABLE, FLAT (FFM-24)	
16	1-783-547-11	CABLE, FLAT (FFM-25)	
21	1-475-749-11	COMMANDER, STANDARD (RMT-V249)	
⚠54	1-468-308-11	POWER BLOCK SR821	
56	1-779-725-11	CONNECTOR, BOARD TO BOARD 5P	
704	1-500-144-11	HEAD, FE	
776	8-839-044-02	DRUM ASSY DZH-94A/Z-RP (M901)	
M902	1-698-971-11	MOTOR, DC (SPINDLE)	
M903	X-3947-577-1	MOTOR ASSY, CAM	

Ref. No.	Part No.	Description	Remarks
		ACCESSORIES & PACKING MATERIALS	
		*******************************	
	1-475-749-11	COMMANDER, STANDARD (RMT-V249)	
	1-696-592-11	CORD, CONNECTION (NTSC) (FOR RF) 1.5m	
	1-775-454-21	CORD, CONNECTION (MONAURAL CABLE) 1.5m	
	1-776-258-11	CORD, AVC CONNECTION (FOR VIDEO/AUDIO) 1.5m	
	1-783-325-11	CORD, CONNECTION (CABLE MOUSE)	
	3-861-573-11	MANUAL, INSTRUCTION (ENGLISH)	
	3-861-573-21	MANUAL, INSTRUCTION (FRENCH) (Canadian)	
	3-861-573-31	MANUAL, INSTRUCTION (CHINESE) (Canadian)	
	3-979-315-01	COVER, JACK	
*	3-979-317-01	CUSHION	
*	3-979-512-01	SPACER	
*	3-987-412-01	INDIVIDUAL CARTON	
		*************	
		HARDWARE LIST	
		*************	
#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2 IT-3	
#2	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#701	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#702	7-682-547-04	SCREW +P 3X6	
#703	7-685-133-19	SCREW (DIA. 2.6) (IT3B)	

Note :	**Note :**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

9-921-684-11

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Home A&V Products Company

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